December 13, 1956

The IRON AGE

How to Figure Executive Pay P. 97

New Magnesium Alloy for Sounder Castings P.127
Scrap Industry: Big Buyer of Capital Goods P. 85
Digest of the Week P – 2

This Whiting Crane at Continental quickly carries heavy coils of wire from storage to production —keeping machines busy without jam-up.

How Continental Steel's "special" cranes pay off!

Continental Steel Corporation, Kokomo, Indiana, depends on three "special" Whiting Cranes to keep production flowing fast. Two of them are 5-ton overhead cranes used to spot coils of wire accurately at automatic wire welding machines, then move the finished reinforcing fabric to shipping or storage. The third Whiting Crane is a low profile gantry with floor level hoisting drive. It moves all production in Continental's pickling department and has played an important part in increasing the company's wire production by nearly 50%. These cranes – like all Whiting Cranes – are "special" because each is custom engineered to do a specific job, day in and day out, with a minimum of maintenance.

WHITING CORPORATION, 15601 Lathrop Avenue, Harvey, Illinois

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An illustrated 6-page case study, "Custom Built Whiting Cranes for Continental Steel Corporation" tells how these cranes were engineered to solve special problems. Write for a copy today.

MANUFACTURERS OF CRANES, TRAMBEAM HANDLING SYSTEMS, TRACKMOBILES, FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

When snow still stands for fun

To "old timers" like us, snow means slippery streets, snarled traffic, tiresome shoveling. But to the eager lad in our picture, snow stands for *fun*. Fun with his new sled, especially. Yes, what greater thrill than swiftly skimming down a snowy slope, the crisp air nipping your cheeks—remember?

At the time you hardly gave a thought to the slender yet strong steel runners that sped you along. But today those runners are worth thinking about. Since they must be shaped just right to do the job best, they are specially rolled. For the same reason, manufacturers of products ranging from scraper blades to steel sash, from bridge flooring to brake shoes, use special shapes, hot-rolled by Bethlehem to their drawings and specifications.

These customers use "tailor-made steel" to avoid unnecessary machining, welding, flame-cutting and other fabricating operations; to cut down scrap losses; to achieve better product design. Perhaps you, too, could make special sections pay in a big way. We'd be happy to discuss it with you. Just call or write the nearest Bethlehem sales office.

A SLED MAKES A GREAT CHRISTMAS GIFT!

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American Acme Co.
Auto-Wheel Coaster Co., Inc.
Garton Toy Co.
Hedlund Mfg. Co.
Kalamazoo Sled Co.
Paris Manufacturing Co.
Standard Novelty Works

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Dec. 13, 1956—Vol. 178, No. 24

The IRON AGE

Digest of the Week in Metalworking

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THE IRON AGE, published every Thursday by CHILTON CO., Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies, 50¢. Annual Review Issue, $2.00. Cables: "Ironage," N. Y.

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Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

SCRAP: A BIG CAPITAL GOODS CUSTOMER P. 85

Scrap industry will spend more than $54 million this year on capital improvements. Next year will be almost as big in investments in heavy equipment. IRON AGE survey pinpoints how and where the money will be spent by the scrap industry.

NICKEL INCREASE HITS STAINLESS STEEL P. 88

Price jump may result in increases in stainless steel. Extras may bear brunt of higher costs. Nickel bearing scrap is even higher in price, far exceeding price of nickel in per lb content. But purchasing trends are not expected to be affected.

WHEN'S THE BEST TIME TO SWITCH CAREERS? P. 89

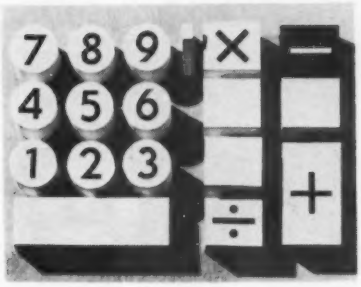
Dave Austin, executive vice president, commercial, U. S. Steel, finds the answer at 58. Others have made similar decisions and the trend may be growing. Austin enters the teaching and speaking field.

AUTO SALES IN '57 MAY REACH 7 MILLION P. 90

Predictions of 6.5 million cars may be too cautious when all factors are taken into consideration. Shortage of cars already exists in some lines. But installment credit picture and world situation could dampen sales.

FRB IS STILL IN HOT WATER OVER POLICIES P. 95

It might be a good idea to have a full-scale investigation of the FRB. There is little agreement on whether current policies are in the right direction. So banking official suggests now may be the time to look at the whole problem objectively.



EXECUTIVE PAY — the problem of adequate compensation for executives and engineers — is getting a lot of attention. Survey report beginning on p. 97 reviews the latest on what companies are doing about salaries, bonuses and pensions.

AXE OUR TAXES, ASKS SMALL BUSINESS P. 115

Small businesses beat the drums for exclusive tax relief. Big firms want reduction of both corporate and personal income taxes. Expect much talk but little or no action on reduction of excise taxes. As long as business continues good and sales are brisk, Congress isn't likely to cut existing excise rates.

FEATURE ARTICLES

NEW MAGNESIUM ALLOY FOR SOUNDER CASTINGS P. 127

New Mg-Al-Zn alloy offers its users such advantages as less tendency towards microporosity, better response to heat treatment and good castability. Usable in both the as-cast and heat treated conditions, it combines attractive mechanical properties with a casting soundness that lowers reject rate.

HANDLE PRESS SCRAP FAST FOR BIGGER PROFITS P. 130

Collecting, moving, and disposing of stamping and shearing scrap usually calls for a specialized setup. Average size, volume and type of scrap determines which handling equipment to use. Skeletons from stamping coil stock wind neatly into high-salvage rolls. Stringy scrap succumbs to special machines twirling it into compact bundles.

HOW SIMPLER STEEL SPECS LOWER COSTS P. 132

Specify your steels by the end properties desired, not by specific material or processing technique. One large steel user finds simplified specification guide pays off big by showing where one steel may substitute for another. In one case, deletion of a hardness requirement saves $330,000 yearly.

SPEED GEAR PRODUCTION WITH CERAMIC-TYPE TOOLING P. 135

Industry's piling up considerable field-performance data on cemented oxide tools. Latest favorable report is on use of the tools for machining sliding gears for auto transmissions. On the 5135 forged steel parts, tools are producing an average 1600 cuts per tool edge.

LET CONDITIONERS SOLVE YOUR AIR PROBLEMS P. 136

In solving problems of heat, smoke or chemical fumes air conditioning may offer more long-run advantages than fans, blowers, and special hoods. One plant went all the way and put in plant-wide conditioning. With combined metalworking and chemical operations, it protects product quality as well as workers' comfort and safety.

MARKETS AND PRICES

WHY AIRCRAFT INDUSTRY BUSINESS SOARS P. 92

Military spending still makes the difference between feast and famine in aircraft. Pentagon spending will hit $9 billion a year for aircraft by 1965. Shift to guided missiles will create big new tooling programs. New commercial orders also help out. Industry has a current backlog of $17.2 billion.

AUTO STYLING SURPRISES ARE ON THE WAY P. 108

Future markets will find three types of vehicles predominating: the small personal car, the compact auto, and the limousine. They will be even lower, have more glass, and lighter bodies. Use of such nonferrous metals as aluminum, magnesium and titanium will be common.

DON'T OVERLOOK PORTLAND AS METALS MARKET P. 115

Metalworking now outranks lumber as the No. 1 employer in this fast-growing market. Wide range of products are produced. The area's aluminum reduction plants are a big factor. Foundry business is thriving.

STRAIGHT LINE SHORTEST, BUT NOT BEST P. 117

MAPI says machine tool buyers can save much as 15 pct on tax depreciation by using sum of digits, or double declining balance method. Newest report tells when to use which for biggest savings.

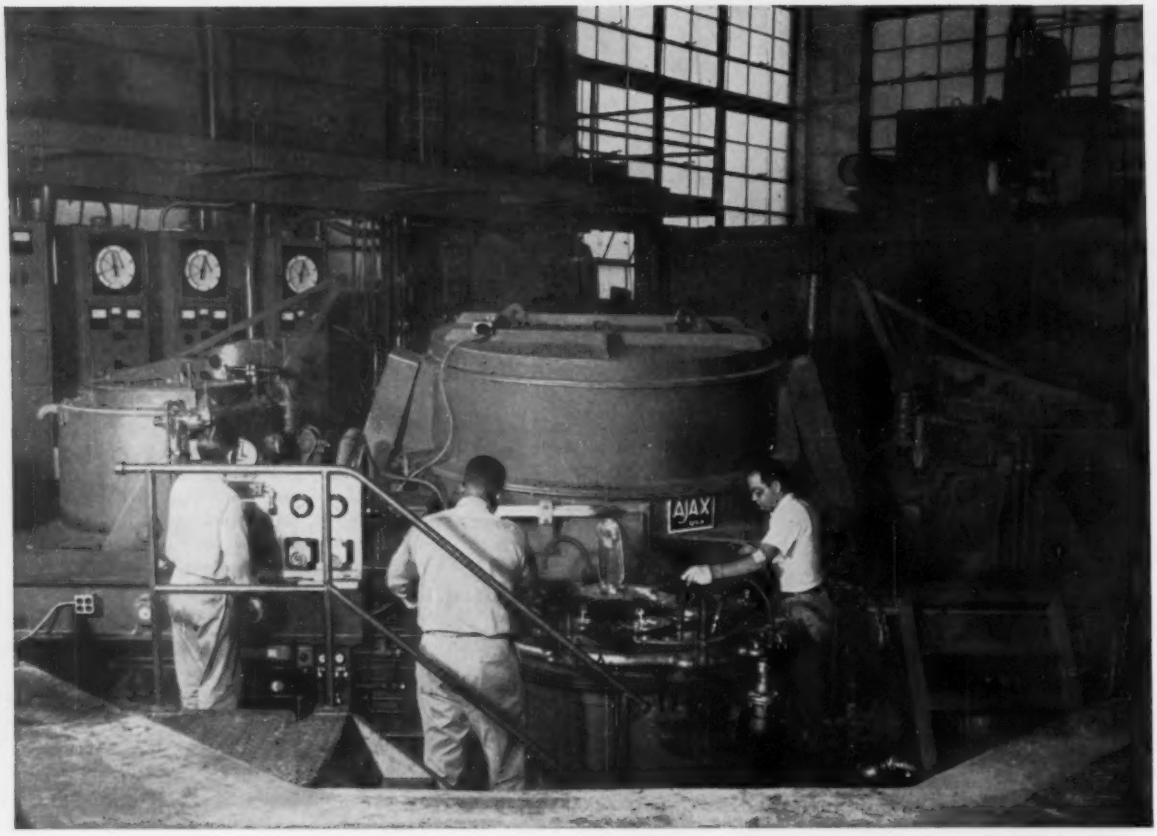
PRESSURE IS ON FOR STEEL PLATE ALLOCATIONS P. 177

Backlash of Suez is building up pressure for allocation of plate for tankers. But counter-pressure is coming from steel mills as well as some government people. Auto producers are stepping up orders.

NEXT WEEK:

ARBITRATORS: BLESSED OR DAMNED?

Some 200 professional arbitrators handle about 10,000 cases a year. Next week's special report will tell you why and points out just how they do it. The author is one of the country's best known labor arbitrators, Theodore W. Kheel.



MODERN ALUMINUM BILLET CASTING

Only the best in extrusion billet quality is good enough for **The Himmel Brothers Company**, Hamden, Conn. They produce architectural aluminum extrusions, most of which are subsequently anodized. Their new electric billet casting shop using an integrated group of induction melting furnaces has assured a consistent supply of top quality extrusion billets.

Billets are turned out at the rate of 2000 lbs. per hour by one supervisor and two men. Clean and cool working conditions, extensive automation, and negligible furnace maintenance provide a high return on this investment.

We should be pleased to give you more facts about this modern way of melting aluminum.

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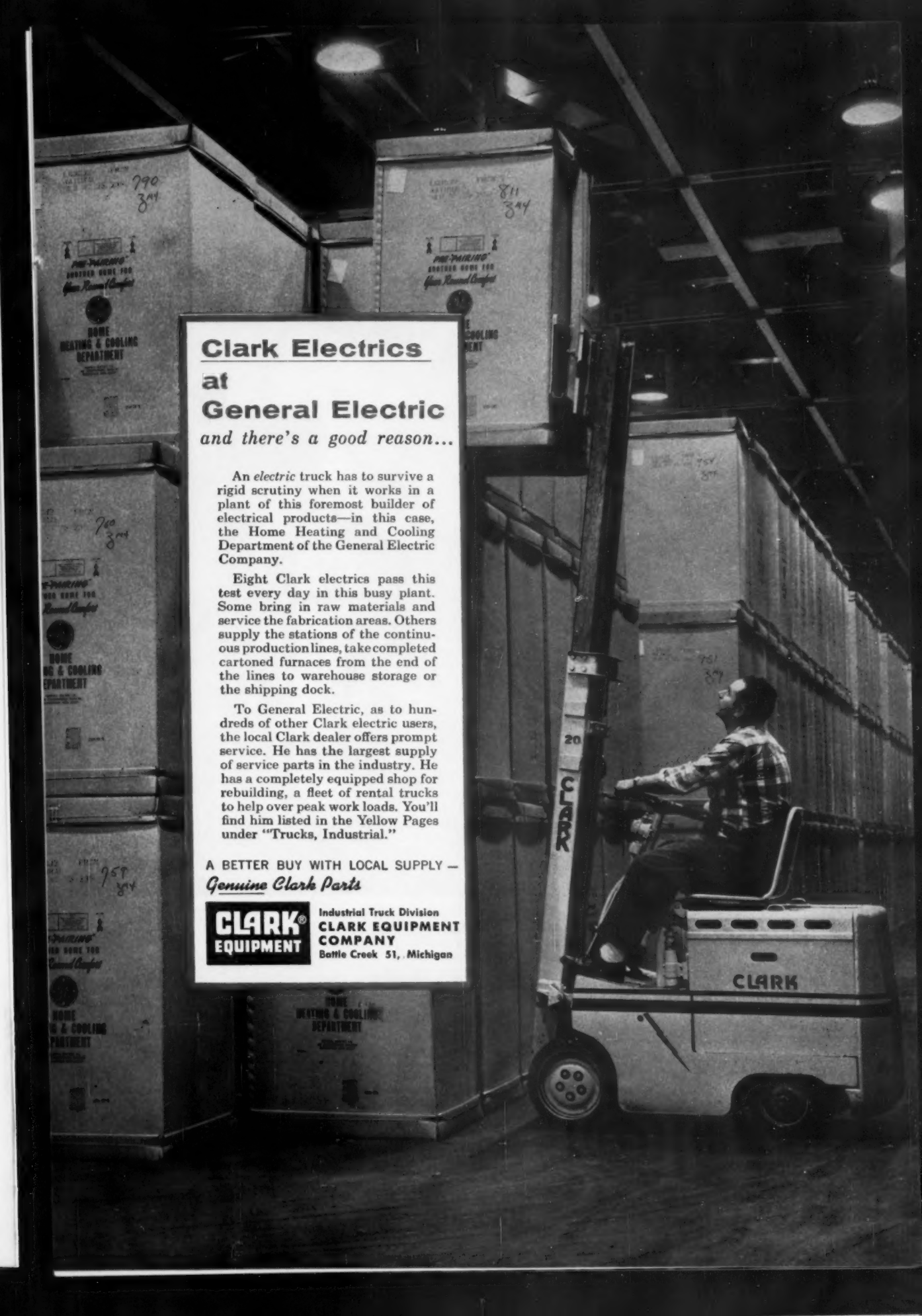
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"...and it's all Stainless Steel"

That women have long held the nation's purse strings, is a fact with which every marketing man is acquainted. In years past, however, it was considered the man's perogative to select the family car. But, the market experts will tell you, today women are fast invading this last male stronghold. The new colors and fabrics are direct results of their influence—and, to a great extent, so is the increased use of stainless steel.

The modern woman knows the value of this amazing metal. She has worked with it in her kitchen and is familiar with its resistance to rust and corrosion and she likes the way it stays new for years on end with a minimum of attention. She wants stainless and discerning designers are catering to her wish.

The promise for tomorrow—more and more stainless—much of it from the mills of Sharon where buyers know they can expect consistent quality, plus the industry's finest finish.

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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

Beware of "Voluntary" Controls

◆ MOST OF US have the art of fooling ourselves down to a science. When we don't like something we call it by another name. Then it sounds as if it were something we really wanted. Most of the time this is harmless, but not always.

Not too long ago everyone agreed that we had "had it" on controls. It is now pretty clear that controls—except in wartime—mess things up more than they help. That's why the Administration is not being panicked into controls for steel.

But is that the whole story? It is beginning to look as though we are again fooling ourselves with semantics. Whether you know it or not, there is an "unofficial" or "voluntary" allocation for the freight car program.

The government did not want to slap on real controls. It believed that this would set off a chain reaction. "We will just help out the freight car program because we are short of cars." That was the quiet backstage talk. So far so good. But there are a lot of steel plate users who had their orders in long before the railroads found out they needed steel.

Now we are hearing talk about "voluntary" steel plate allocation for the tanker program. Again we are deluding ourselves that this would not be a "control." It would be just as much a control as a general order from the Office of Defense Mobilization.

Plate output is rising. Capacity is being increased. There is no honest reason for government to step into the plate picture with another "voluntary" program.

Steel mills should handle their own troubles and allocations. They know their customers and how badly they need steel. To pass the buck to a quasi-control group is ridiculous.

What if a maker of toy steam engines demanded plate allocations in order to reduce juvenile delinquency? Maybe he has a good point, how do we know? What about his "voluntary" program?

It helps to remember that Washington, D. C., doesn't make one pound of steel.

Tom Campbell

EDITOR-IN-CHIEF

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dear editor:

letters from readers

Bottleneck

Sir:

Please forward to my attention either a reprint of the article on "New Oxygen Steel Making Process Pays Off" in your Oct. 18, 1956, issue or another issue of the magazine for that week.

Someone here removed the article before we had a chance to read it.

Our study of oxygen uses is hampered unless we can recover the information the article contained.

Please continue your valued assistance to metalworking by continuing the types of articles you have carried in the past. *H. A. Eichstaedt, Sales Engr., Ronan and Kunzl, Inc., Marshall, Mich.*

Tearsheets are on the way.—Ed.

Chip Handling

Sir:

We have read with great interest your excellent series on chip handling (Nov. 1, 8, 15, 22 and 29).

Your presentation of the economic benefits, both direct and indirect, and the problems and possible solutions governing the correct removal of chips should prove to be of great benefit to your readers. *H. A. Sullivan, Jr., Asst. Gen. Mgr., Prab Conveyors, Inc., Roseville, Mich.*

The Real Dope

Sir:

I read your very interesting article titled "Ten Commandments of Industrial Health" (Nov. 8). This is good dope and I know many people that could benefit from the information. In order to spread the word around, I'd like to take advantage of your kind offer of an additional copy of this article. *J. W. McVicar, Naval Supply Center, Oakland, Calif.*

Wears Well

Sir:

It was indeed a pleasure to read your article "Get Better Wear Resistance With Ceramics," in your Nov. 22 issue.

As a supplier of ceramics, we would appreciate receiving about twelve copies. *R. G. King, Sales Mgr., Vitro Mfg. Co., Pittsburgh.*

Good Show

Sir:

Your article "Automotive: It Buys Big," in the Oct. 25 issue, is intensely interesting and will be of tremendous interest to my classes in Engineering Administration.

Frankly, this is the best exposition of production planning that has come my way. It would seem that such material should be included in text books rather than the usual hypothetical information. *G. S. Schaller, Prof. of Mechanical Engineering, U. of Washington, Seattle.*

"Don't ship it until next month . . . They might get the impression we're just a small time outfit!"

Bearings, Inc.

the foundryman's friend...through service!

Dirt... the most feared enemy of any good anti-friction bearing was damaging many bearings in the maintenance stock at the Taylor and Boggis Foundry Division of The Consolidated Iron-Steel Mfg. Co. of Cleveland, Ohio. John Cunin, Bearings, Inc. salesman, was called and within a short time, under the direction of the Taylor and Boggis Maintenance Superintendent reorganized their maintenance stocks of bearings and developed a more practical record keeping system.

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Second—all bearings in use in the foundry were identified by the Bearings, Inc. salesman according to the bearing manufacturers' numbers. By converting the equipment manufacturers' parts numbers to standard bearing numbers, many bearings purchased from various sources under a variety of parts numbers were found to be identical.

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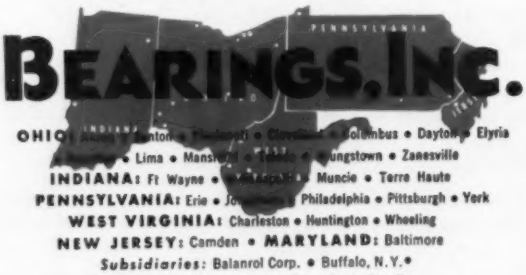

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INDIANA: Ft Wayne • [illegible] • Muncie • Terre Haute
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fatigue cracks

The Man Behind The Figures

We all like to know what the other guy's getting. But for Dean Rosensteel it's more than just curiosity. It's part of his job.

As director of AMA's Executive Compensation Service he supervises the surveying of thousands of management jobs. Some of the results are shown in this week's special article, "How To Figure Executive Pay."

But, as we said, surveys are only part of Dean's job. Most of

AMA's Rosensteel

his work involves counselling firms on the establishment and operation of their compensation programs.

He's well up to the task. Before heading up the AMA service he was manager of wage and salary administration for Montgomery Ward & Co. He has also developed some of the most extensive compensation programs in current use; served as a consultant to the Salary Stabilization Board; and authored numerous articles on the subject.

One thing—Dean's not addicted to flights of fancy. He can't be. When subscribers to the service want the facts on salaries, he's got to have them. And they've got to be realistic. To learn some of them, turn to p. 97.

Sneak Preview

Life is full of little surprises. Even the editors are taken a-back occasionally. It happened again last week when Bill Laimbeer of our research department came up with some figures based on a survey of iron and steel scrap yard operators. The editors wanted to know how much this industry was spending on capital equipment—such things as balers, cranes, industrial trucks, etc.

Well, as we said, the results were only a little surprising because we keep a sharp eye on scrap and we knew it had been expanding to keep up with the steel industry. We sneaked a look as the editors hustled off with the figures for their weekly give-and-take with the art department. And we'll swear it looked like a $50 million or so market for 1956. Better turn to p. 85. Maybe you've been missing a bet.

New Puzzler

Mr. W. W. Bell, The Lummus Co., N. Y. C., has kindly offered this little twister.

There is a rope over a pulley with a weight fastened to one end. At the other end of the rope there is a monkey of equal weight to the weight. The rope weighs 4 ounces per foot. The sum of the monkey's and his mother's age in years is equal to the weight of the weight in pounds. When the monkey was half as old as his mother is now she was half as old as the monkey will be when he is 3 times as old as the mother was when she was 3 times as old as the monkey. The weight of the rope plus the weight of the weight is half as much as the weight of the monkey plus the weight of the weight. How long is the rope? Boy!

Automotive Steering Knuckle Support
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Whether you produce rugged, heavy-duty forgings or lightweight, high-strength parts, J&L forging steels give the best results. Our staff of experienced metallurgists is available to help you establish the specifications to fit your need. Write or phone our nearest district office.

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J&L FORGING STEELS EXACTLY TO SPECIFICATION

dates to remember

JANUARY

American Electroplaters Society—Winter meeting, Jan. 12, Sheraton Penn Hotel, Pittsburgh. Society headquarters, 445 Broad St., Newark 2, N. J.

Institute of Scrap Iron & Steel, Inc.—Annual convention, Jan. 13-16, Eden Roc and Fontainebleau Hotels, Miami Beach, Fla. Society headquarters, 1729 H St., N.W., Washington, D. C.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 14-18, The Sheraton-Cadillac and Statler Hotels, Detroit. Society headquarters, 29 W. 39th St., New York.

EXPOSITIONS

American Society for Metals—March 25-29, Los Angeles.

American Foundrymen's Society—May 6-10, Cincinnati.

The Society of Plastics Engineers, Inc.—Annual national technical conference, Jan. 16-18, Hotel Sheraton-Jefferson, St. Louis, Mo. Society headquarters, 34 E. Putnam Ave., Greenwich, Conn.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 17-18, Palmer House Hotel, Chicago. Assn. headquarters, 79 W. Monroe St., Chicago.

Malleable Founders' Society—Semi-annual meeting, Jan. 18, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Compressed Gas Assn., Inc.—Annual meeting, Jan. 21-23, Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

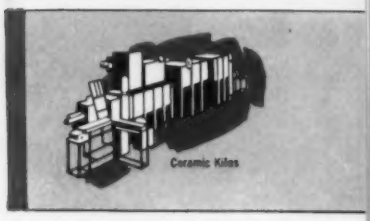
American Standards Assn.—Gaillard seminar on industrial standardization, Jan. 21-25, Engineering Societies Bldg., New York. Society headquarters, 70 E. 45th St., New York.

American Boiler Manufacturers Assn., & Affiliated Industries—Mid-winter meeting, Jan. 22, Hotel Statler, Cleveland. Assn. headquarters, 1571 W. 117th St., Cleveland.

Industrial Heating Equipment Assn., Inc.—Annual meeting, Jan. 28-29, The Shoreham Hotel, Washington. Assn. headquarters, 1145 19th St., N.W., Washington, D. C.

Cutting Tool Mfrs. Assn.—Annual meeting, Jan. 29, Detroit Yacht Club, Detroit. Assn. headquarters, 416 Penobscot Bldg., Detroit.

BRAND-NEW IDEA in heat treating furnaces



o o proving again . . . .

FOR CARBONITRIDING, BRIGHT HARDENING, CARBURIZING OF SMALL METAL PARTS

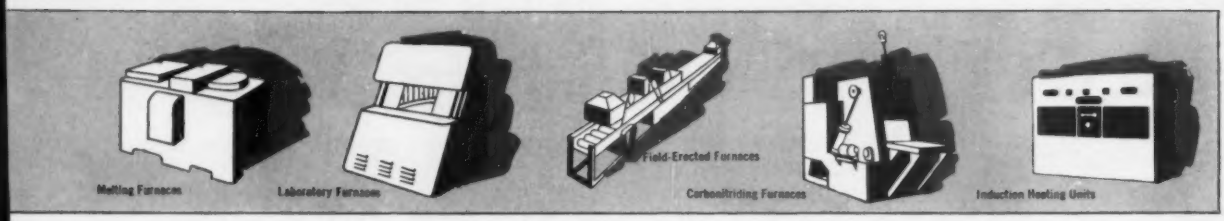
This is a completely new furnace, an exclusive Lindberg development. It is the first time induction heating has ever been offered in a heat treating furnace. No elements, no burners, no electrical or gas connections in it. Heating efficiency is high and the furnace can be brought to hardening temperatures in 17 minutes from cold. Temperature control is highly accurate, eliminating temperature override and lag for all practical purposes.

The Induct-O-Ring's circular shape eliminates door-opening heat and atmosphere losses and saves floor space. Work load is automatically charged and moved through the work chamber by a gentle, quiet, reciprocating movement of the furnace. The furnace is completely adaptable to automatic production processes, where its precise heat control, negligible maintenance and dependable operation are of particular importance.

- **No elements, no burners**
- **No gas or electric connections in furnace**
- **Built like a fine machine tool**
- **Precise temperature control**
- **Very low maintenance**
- **Quiet, automatic, trouble-free**

induct-O-ring*

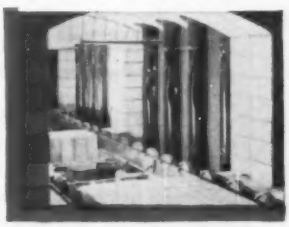
*U.S. and foreign patents pending



. . . it's better to talk it over with LINDBERG

If you are concerned with the application of heat to industry it makes good sense to talk it over with the most widely experienced experts you can find. We believe we have them here at Lindberg. Our only job is developing industrial heating equipment and we offer the most complete line in the field; heat treating furnaces, melting furnaces, high-frequency induction units, ceramic kilns; big ones, small ones, built in our own plant or field-erected. This gives us the experience and know-how to come up with something really new, like this revolutionary Induct-O-Ring furnace, time and time again. So take your industrial heating problems to the experts. Our engineers and technicians can have the right answer. Talk it over with Lindberg.

Another Lindberg achievement! The use of electricity in carbonitriding and carburizing furnaces has been made completely practical by Lindberg's recent development of the CORRTHERM electric heating element. This element is now being used in many furnace installations where ordinary electric heating elements could not operate successfully.



For fuel-fired furnaces, another important development, the famous "dimple" vertical radiant tube was created by Lindberg. This lightweight, easily-changed tube provides a big advance in furnace efficiency and effects a marked saving in operation and maintenance costs. Minimizes shut-downs and costs for tube changes.

Through the years Lindberg research and development laboratories have originated and perfected many other important heating processes, developments such as the Cyclone tempering furnace, automatic control of carbon potential in furnace atmospheres, 60 cycle induction melting and completely automatic ceramic kilns.

Many important Lindberg developments have come as a direct result of some good customer's need. With the customer's cooperation Lindberg engineers have frequently provided an answer to some pressing production problem. You will benefit, too, whether you need some specific Lindberg equipment or have an industrial heating problem that needs a solution if you'll just talk it over with Lindberg. Call your nearest Lindberg Field Representative. There's one (see your phone book) in every major industrial center.

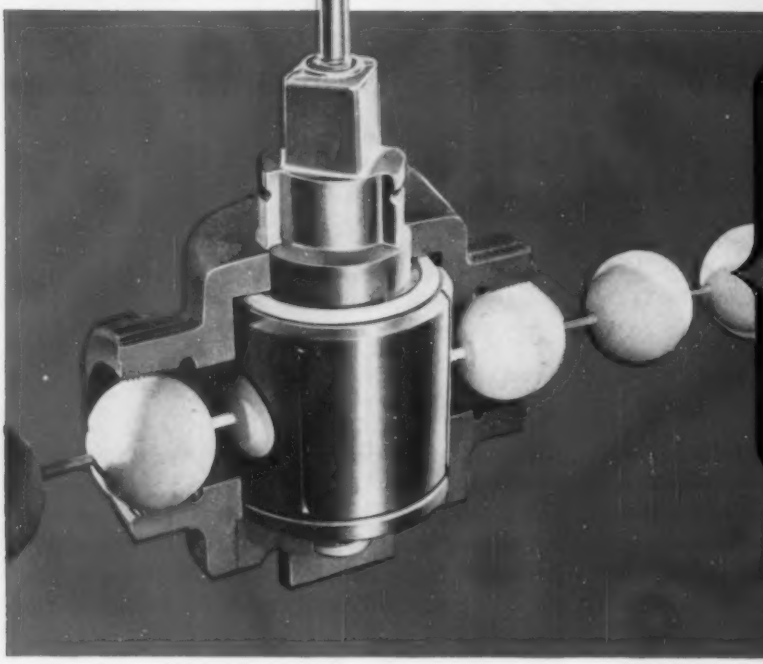
LINDBERG ENGINEERING COMPANY

2452 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.

Associate Companies: Lindberg Industrial Corporation, Chicago • EFCO-Lindberg, Ltd., Montreal, Canada • Lindberg Italiana, Milan, Italy • The Electric Furnace Company, Ltd., Weybridge, Surrey, England • Etablissements Jean Aubé, Paris, France • Lindberg Industrie Ofenbau, Gross Auheim, Germany • Toyo Menka, Tokyo • Lindberg Engineering Company (Australia) Pty. Ltd., Melbourne

acf Lubricated Plug Valves



ROUND PORT MEANS FREE FLOW ALL THE WAY

In salt water disposal plant.

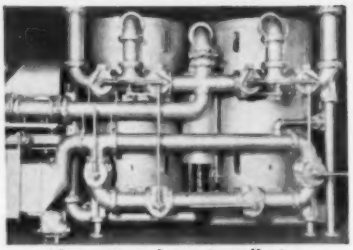
You get full volume, unrestricted flow throughout the entire piping system when you use acf Round Port Valves.

The pipe-matching port openings cause no loss in head pressure—offer no more resistance to flow than the pipe itself. There are no obstructions—no turbulence and no harmful abrasive effects from solids in suspension. Even the most heavy viscous ladings flow freely through acf Round Port Valves.

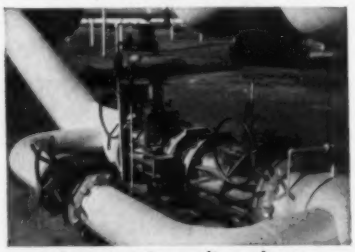
Split-second quarter-turn shutoff, non-wedging cylindrical plug, Teflon* head gasket, are additional advantages that add to perfect performance of acf Round Port Valves—that mean extra long trouble-free service—lower maintenance costs and fewer work stoppages.

Act now to step up valve performance—to keep maintenance costs down. Representatives in 50 principal cities.

*DUPONT TRADE NAME



Absorptive dryer installation.



In natural gasoline plant.

In oilfield service

W-K-M

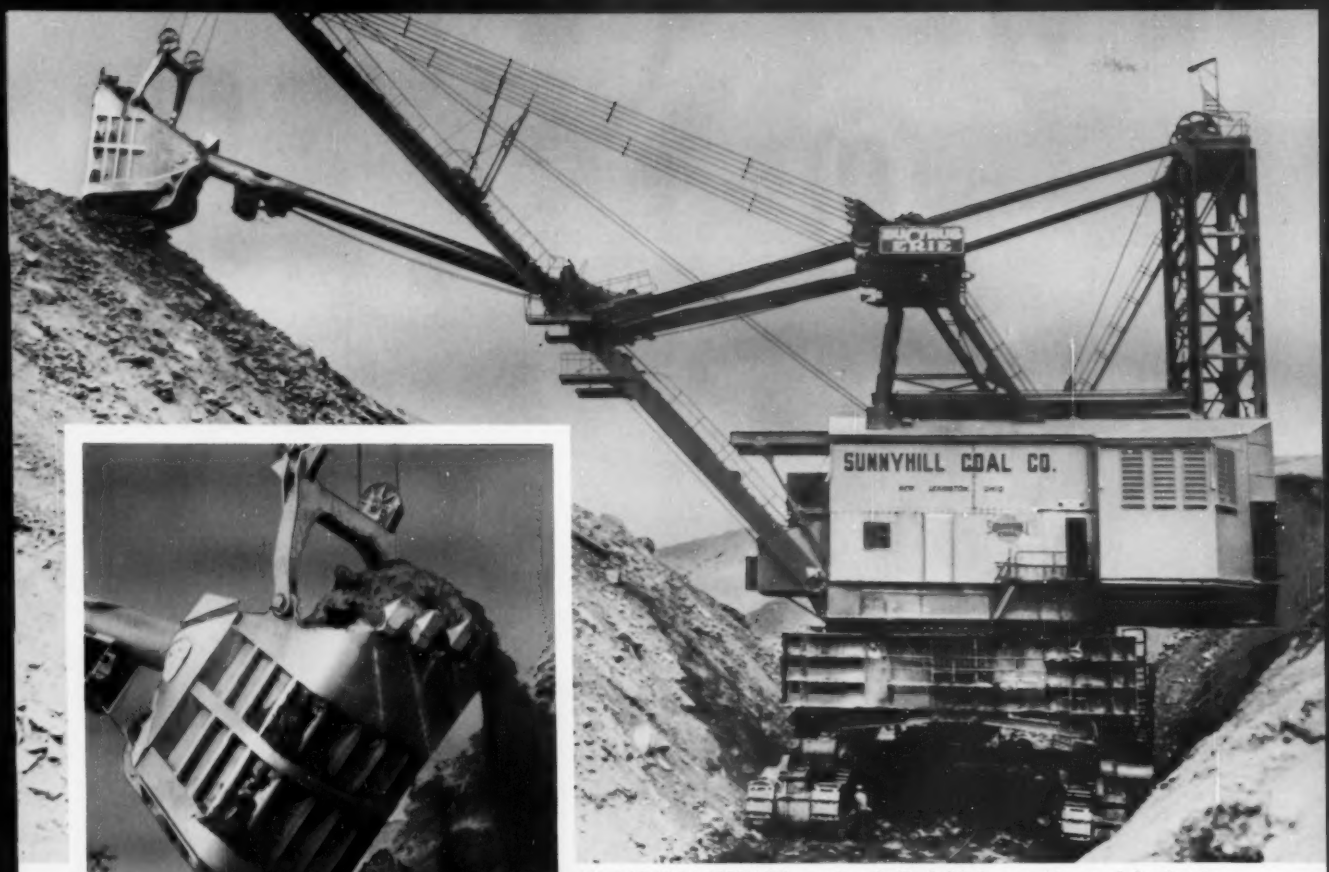
DIVISION OF acf INDUSTRIES INCORPORATED

PLANT: MISSOURI CITY, TEXAS

MAILING ADDRESS: P. O. BOX 2117, HOUSTON, TEXAS

MANUFACTURERS OF

W-K-M	acf	KEY
THROUGH-CONDUIT GATE VALVES	LUBRICATED PLUG VALVES	RETURN BENDS AND FITTINGS



ALL USS "T-1" STEEL! The entire shell of this larger 45-cu. yd. bucket is fabricated from ½-inch USS "T-1" Steel plate. Liner plates are made from ⅜-inch "T-1" Steel with a minimum Brinell hardness of 321. Dipper lip, now made from 6½-inch USS "T-1" Steel plate, formerly was nearly a foot thick. Dipper door and bail also are USS "T-1" Steel. Durability and resistance to impact abrasion are excellent.

USS "T-1" STEEL PLATE . . . replaces castings . . . saves weight . . . boosts shovel capacity 25%

BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin, wanted to boost the productive capacity of its Model 1050-B stripping shovel. But they didn't want to redesign the entire machine. Instead, they redesigned just the dipper . . . increased its capacity from 36 cubic yards to 45. Lighter-weight construction with USS "T-1" Steel made it possible.

The high yield strength and resistance to impact abrasion of USS "T-1" Steel enabled Bucyrus-Erie to replace large, heavy castings with plate that is little more than half as thick. The thinner-sectioned "T-1" Steel not only saves weight but makes possible a thinner, curved dipper lip that bites into overburden more easily than the previous design.

Bucyrus-Erie has taken advantage of USS "T-1" Steel to accomplish the same sort of improvement on other shovels. They have increased capacities from 28 to 33 cu. yds. . . . from 26 to 32 cu. yds. . . . from 20 to 24 cu. yds. In every case, they have done it without sacrificing performance or durability.

Look into the economy of USS "T-1" Steel in original equipment or for repair of existing machines. Remember, it has phenomenal subzero toughness, excellent high temperature strength, good resistance to impact abrasion, as well as unusually high yield strength of 90,000 psi. And it is easily weldable—without pre- or post-heating.

Write, wire, or phone any United States Steel Office for additional information.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

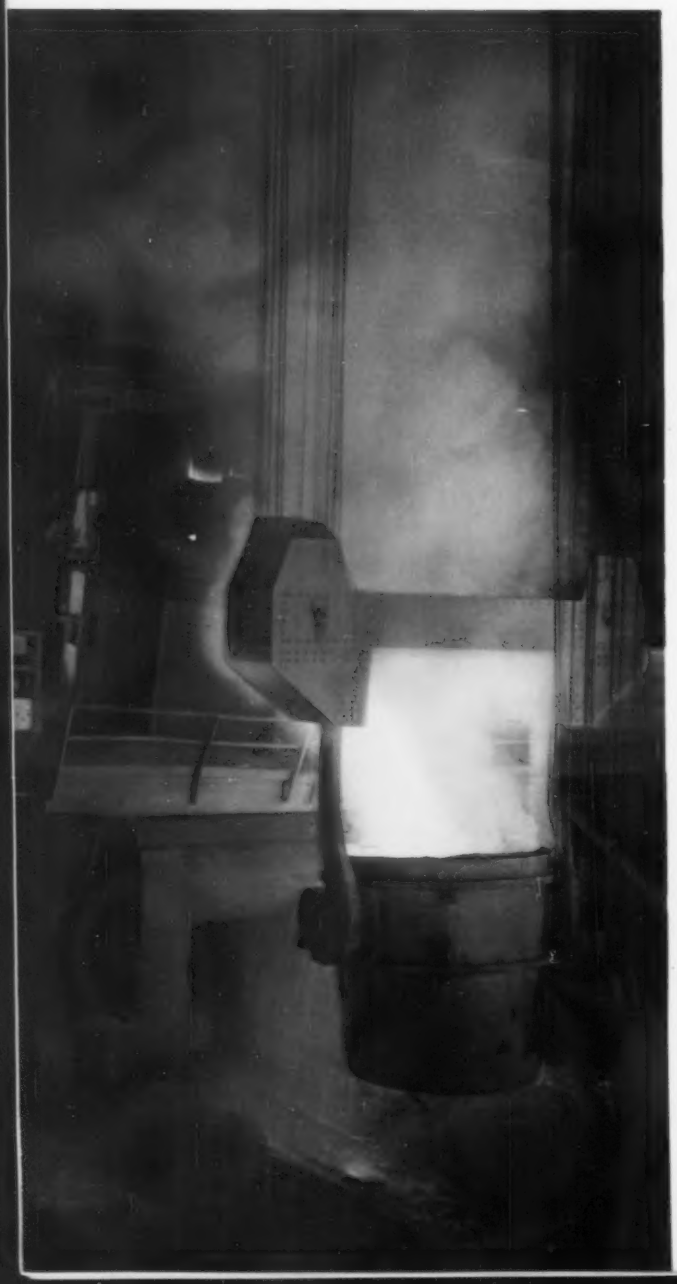
SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS

UNITED STATES STEEL

SKF uses USS Quality Steel

FOR about nine years, SKF Industries, Inc. has been making the "SKF Multi-Row Cylindrical Roll Neck Bearing." According to SKF, the design provides the greatest load-carrying capacity that can be attained in a given space, yet the bearing is completely separable for inspection and maintenance.



Recently, SKF completed the largest bearings of this particular design ever made—each 46½" OD and weighing 7,000 pounds! The rings for these bearings were forged from a premium-quality USS Steel.

After the bearings are ground and honed, there can be no surface imperfections that might cause stress concentration. Internally, the steel has to be sound enough to carry tremendous loads and pressures. These bearings have a mill rating of nearly eight million pounds —reason enough for using USS quality steel for the all-important rings!

USS uses a specially prepared electric furnace for melting this kind of steel. Every precaution is taken to assure the utmost in cleanliness, and great care is exercised in the slag composition and in the introduction of alloying additives. Tapping and pouring temperatures are held to narrow limits, and the ends of the ingot are cropped so that only the best steel can be used for forging.

We would appreciate your inquiries for USS Quality Forgings or rolled alloy bars and semi-finished stock for any size bearings. Address inquiries or requests for our 32-page booklet on USS Quality Forgings to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts . . carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

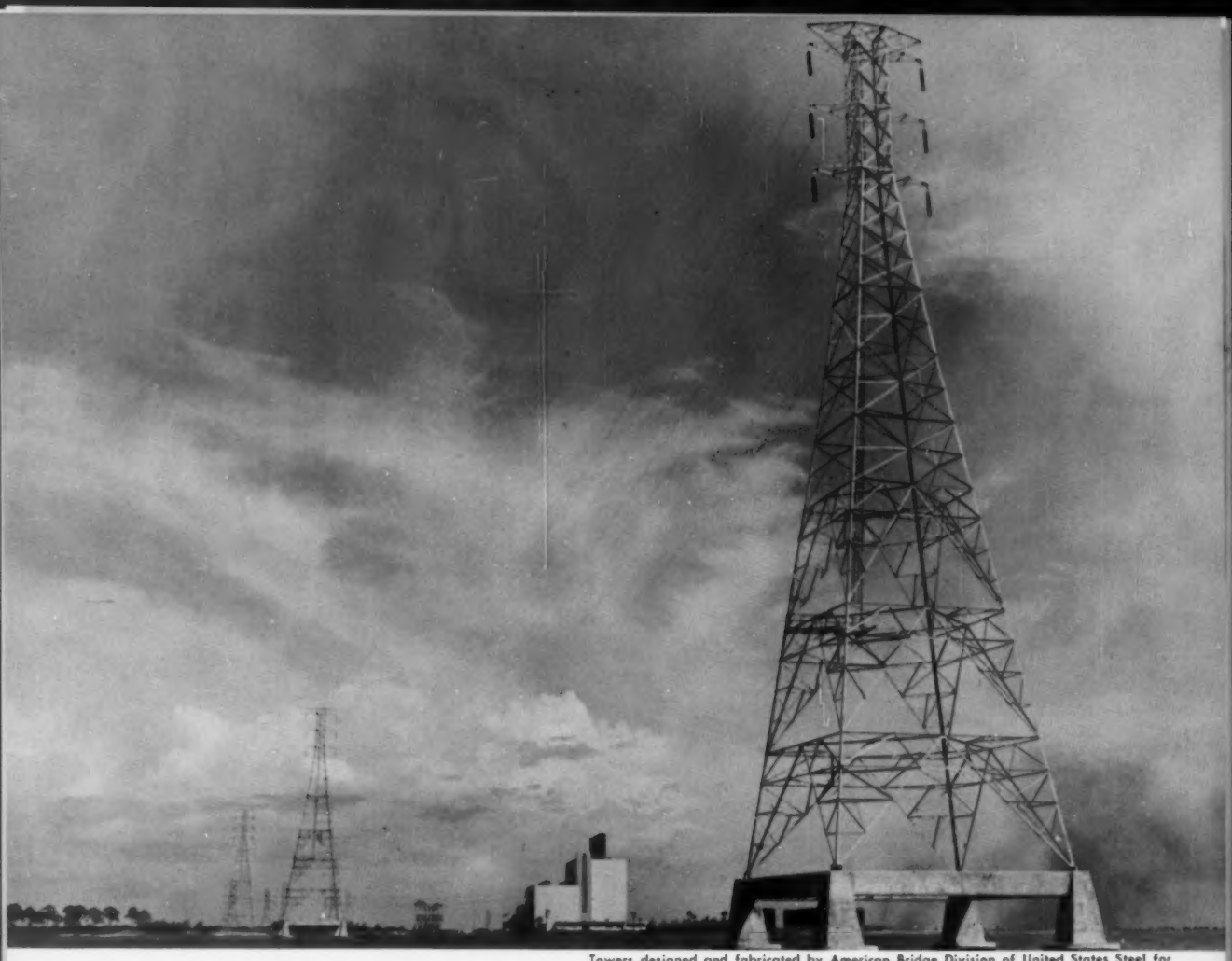
USS

UNITED STATES STEEL

80-ton electric furnace in which the bearing steel was melted.

Bearing has four rows of cage-retained rollers. Dimensions are 46½" OD, 33" bore and 33½" width. It weighs 7,000 lbs.

for 3½-Ton Bearings



Towers designed and fabricated by American Bridge Division of United States Steel for Florida Power Corporation. Erected by Southeastern Utilities Service Company, Miami, Fla.

26 tons of weight saved by USS MAN-TEN Steel saves $7,200 in erection costs

Because power transmission towers are frequently installed in locations far removed from regular means of transportation, every pound saved reduces shipment and erection costs.

The four towers crossing Old Tampa Bay from the Florida Power Corporation's Higgins plant forcibly illustrate this fact. These towers, built 198 ft. high to provide a 100 ft. clearance over mean low water, had to be designed to resist hurricane force winds of 135 mph, with an overload capacity factor of 1.25.

The high strength required was readily obtained by using USS MAN-TEN Steel rather than plain carbon steel in the tower legs. At the same time, because of MAN-TEN's high yield point of 50 000 psi, it was possible to reduce weight of legs by 26 tons. This considerable saving in steel tonnage reduced the cost of the towers even though USS MAN-TEN Steel costs a little more.

The big saving, however, was in cost of erection.

There were two different rates involved; one for erection over water and one for erection on land. 6½ tons were trimmed from each of the three towers erected over water, resulting in a $6,000 saving. The tower erected on land weighed 6 tons less, providing an additional $1,200 saving—or a total erection cost saving of $7,200.

If you are looking for construction that will save money for you by reducing weight, prolonging life and minimizing maintenance—at little or no increase in first cost—find out more about USS High Strength Steels—USS MAN-TEN, USS COR-TEN and USS TRI-TEN. You'll find our 174-page "Design Manual for High Strength Steels" extremely useful in applying these steels. For free copy write—on your company letterhead—to United States Steel Corp., Room 5223 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS HIGH STRENGTH STEELS

USS MAN-TEN · USS COR-TEN · USS TRI-TEN

6-672

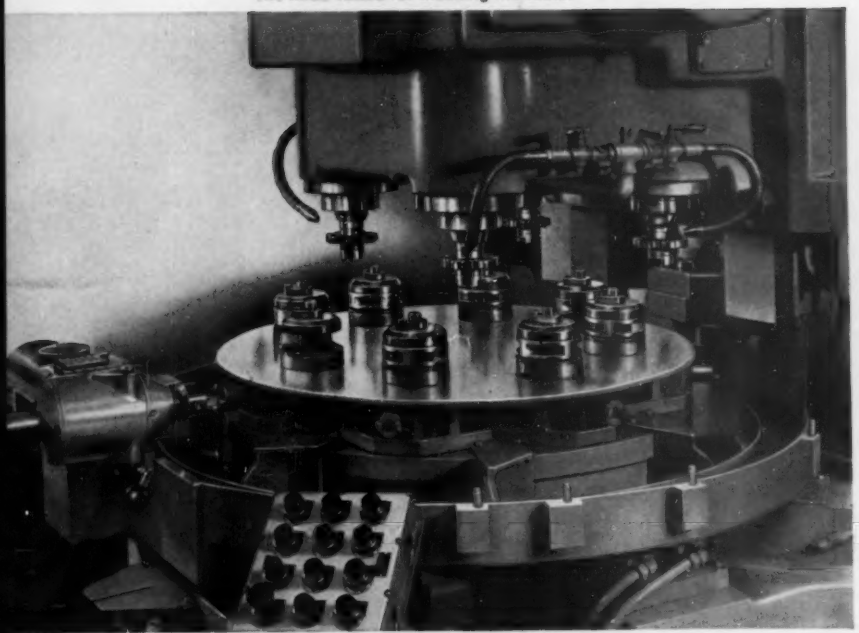
UNITED STATES STEEL

80 PARTS PER HOUR

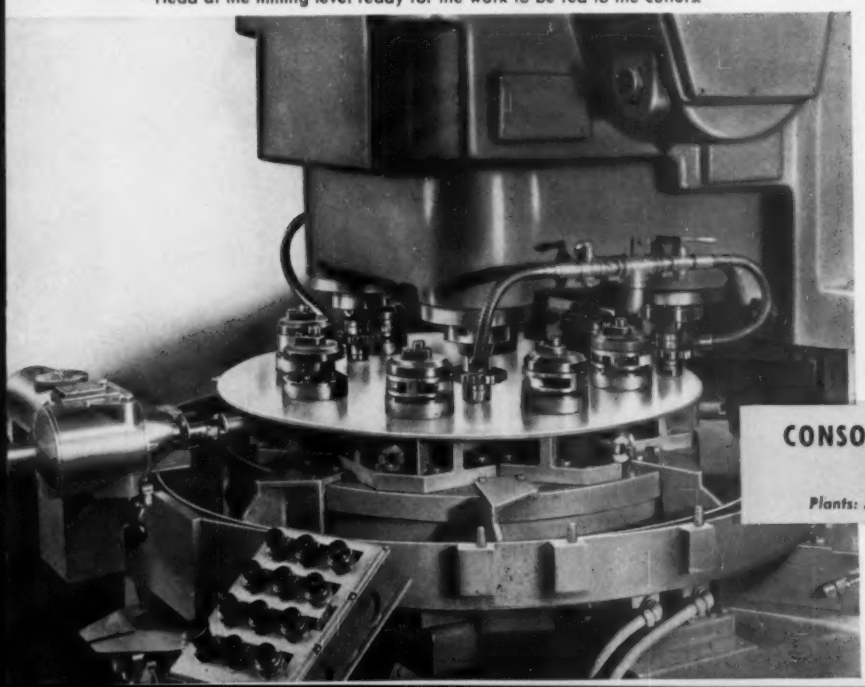
AUTOMATICALLY INDEX-MILLED

on a Newton vertical rotary

The head raised for indexing the table.



Head at the milling level ready for the work to be fed to the cutters.



On the job at a leading automotive plant, the Newton vertical rotary in the photos turns out eighty finished parts per hour. All movements are hydraulic, and each index produces a finished piece—milled on four sides.

The cycle is as follows: (1) the head raises and the table indexes to a precision-locked position, (2) the head lowers to the milling level, (3) the table traverses and feeds in a straight line to the cutters and the work is milled to depth, (4) the table backs away in fast traverse and the head raises, (5) the table revolves for the start of the next automatic cycle.

The Newton vertical rotary has been designed to save time and energy in every phase of the operating cycle. For index milling, an NVR adds up to a substantial increase in production efficiency.

For more about Newton vertical rotaries, ask for bulletin 651.

CONSOLIDATED MACHINE TOOLS

Engine Lathes
Vertical Boring and Turning Mills
Floor and Planer-Type Horizontals
Planers, Double Housing and Openside
Planer-Type Milling Machines
Plate Edge Planers
Vertical Slotters
Rotary and Straight-Line, Production-Type Milling Machines
Skin Mills for Aircraft Manufacturing
Circular Cold Saws
Railroad Wheel and Axle Machinery
Special Machine Tools

CONSOLIDATED MACHINE TOOL DIVISION
FARREL-BIRMINGHAM COMPANY, INC.
Rochester 10, New York
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N.Y.

F/B

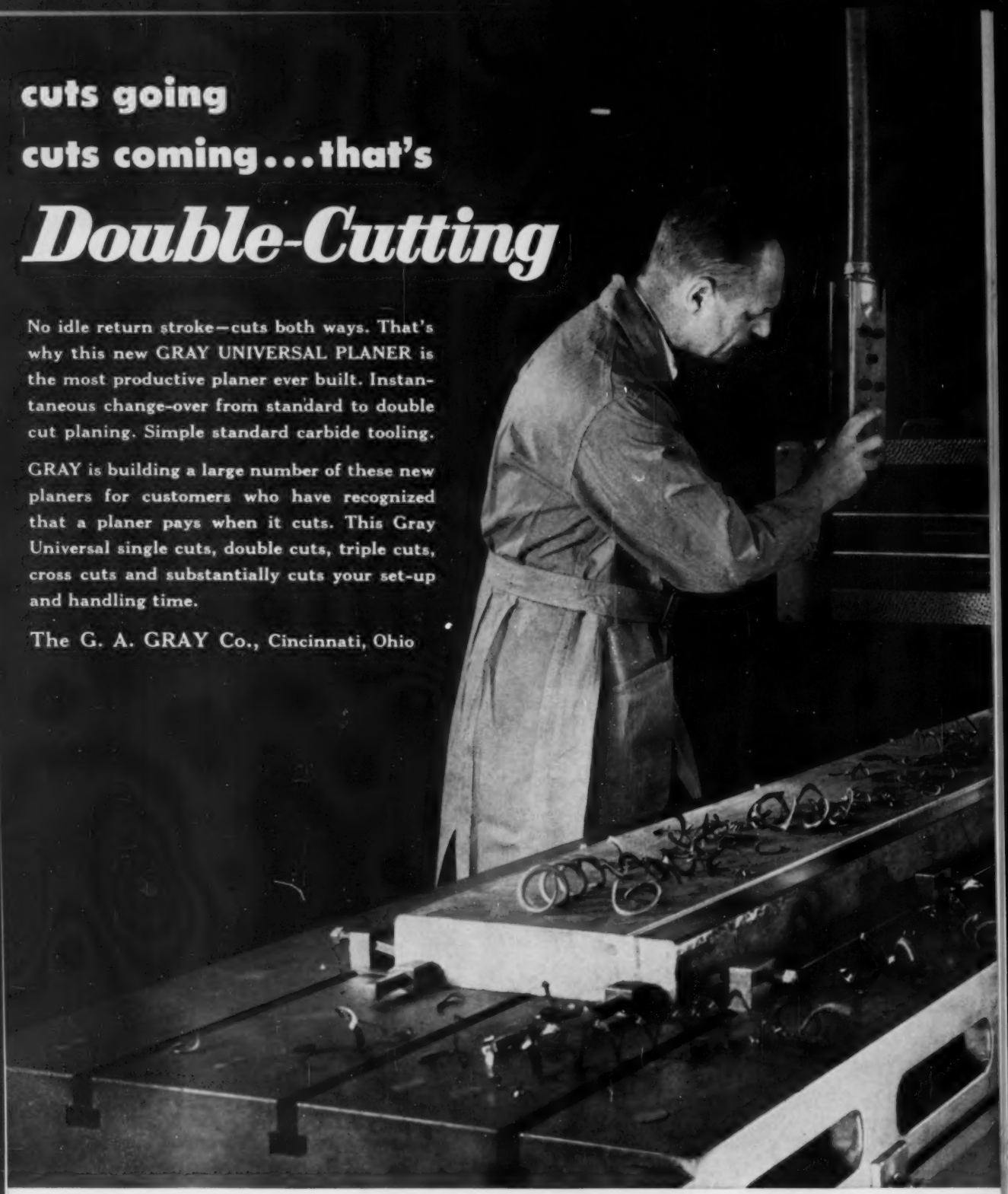
CM-

cuts going
cuts coming...that's
Double-Cutting

No idle return stroke—cuts both ways. That's why this new GRAY UNIVERSAL PLANER is the most productive planer ever built. Instantaneous change-over from standard to double cut planing. Simple standard carbide tooling.

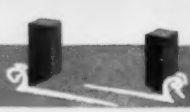
GRAY is building a large number of these new planers for customers who have recognized that a planer pays when it cuts. This Gray Universal single cuts, double cuts, triple cuts, cross cuts and substantially cuts your set-up and handling time.

The G. A. GRAY Co., Cincinnati, Ohio



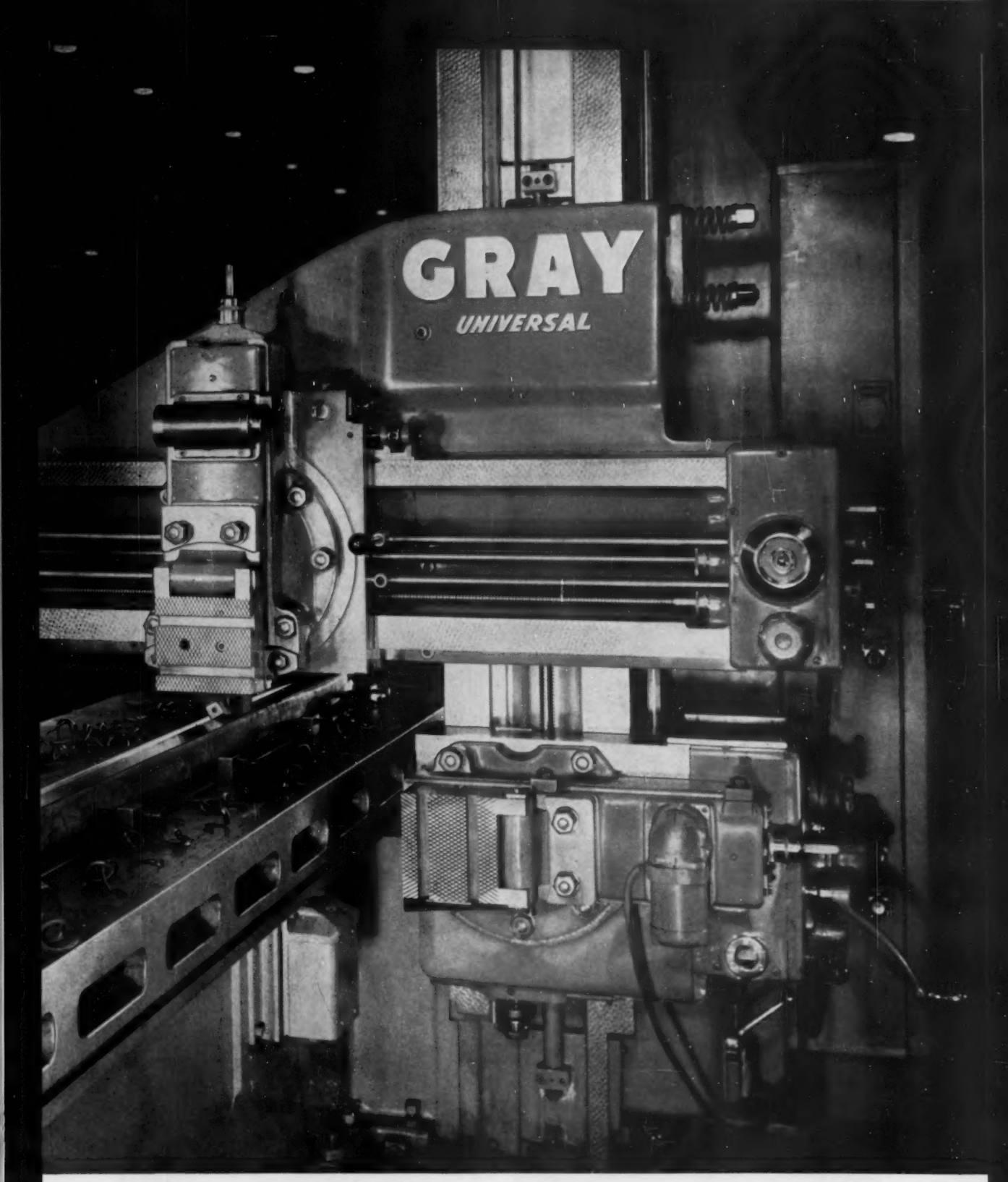
heavy-duty planing

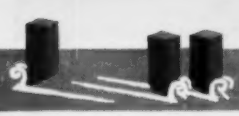
The Gray Universal is the world's most powerful planer available for conventional planing. Its rigidity and speed are ideally suited for modern carbide cutting.



double cut planing

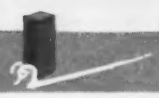
The flick of a lever, the touch of a button permits double cutting. Elimination of the idle stroke insures the world's most efficient flat surface machining. Only simple carbide tools are required.





triple cut planing

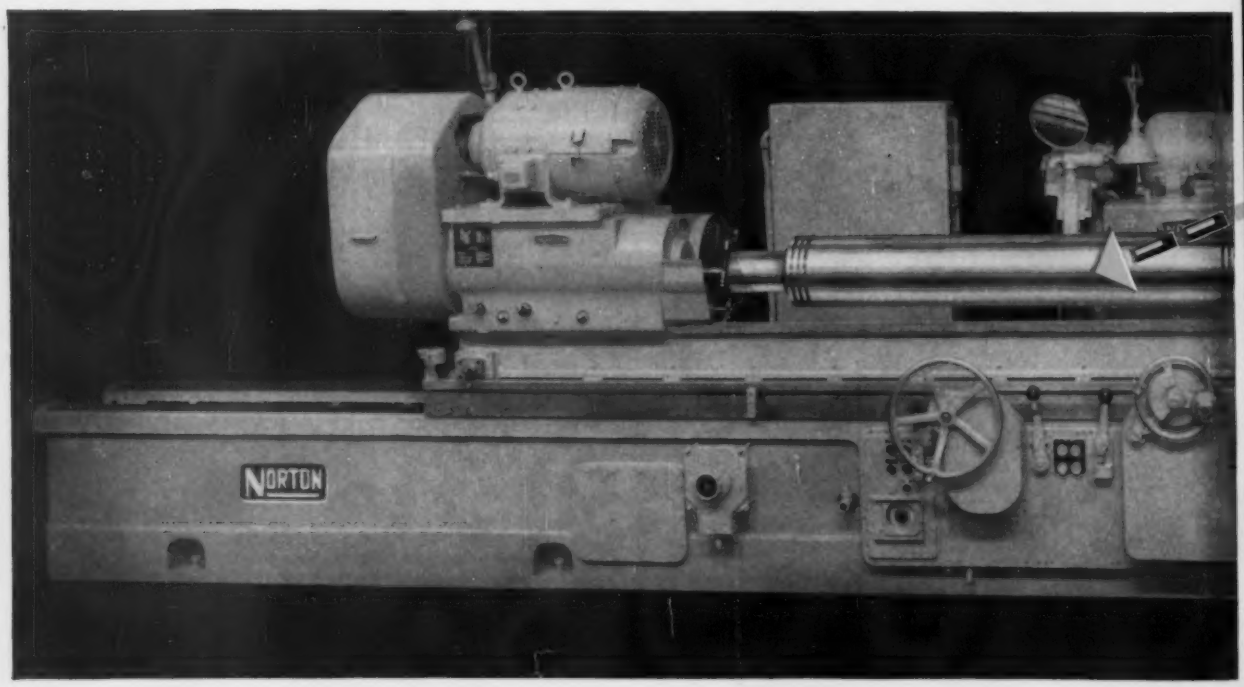
Rough and rough-finish plane at the same time. Rough by double cut planing and simultaneously rough-finish with a single point tool. Then finish plane without a tool change.

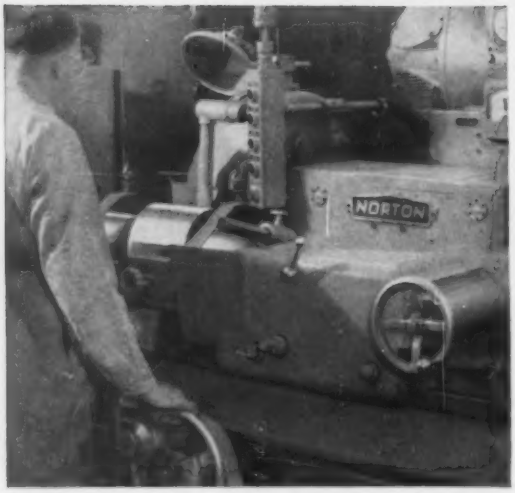


cross planing

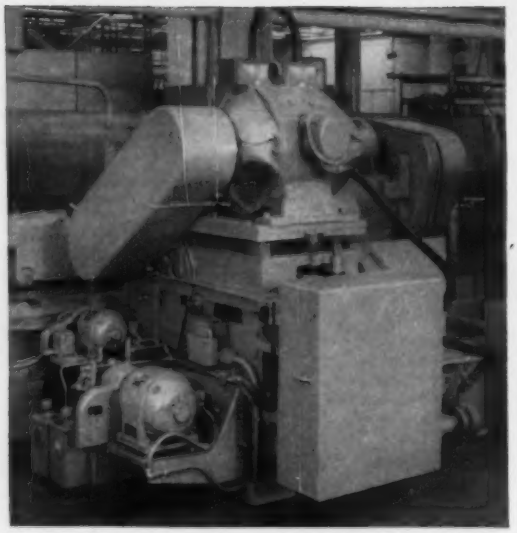
Eliminates extra settings by cross planing the occasional keyways, chamfered corners, and other troublesome small cross surfaces that formerly added hours to your set-up time.

Here's a heavy duty grinder





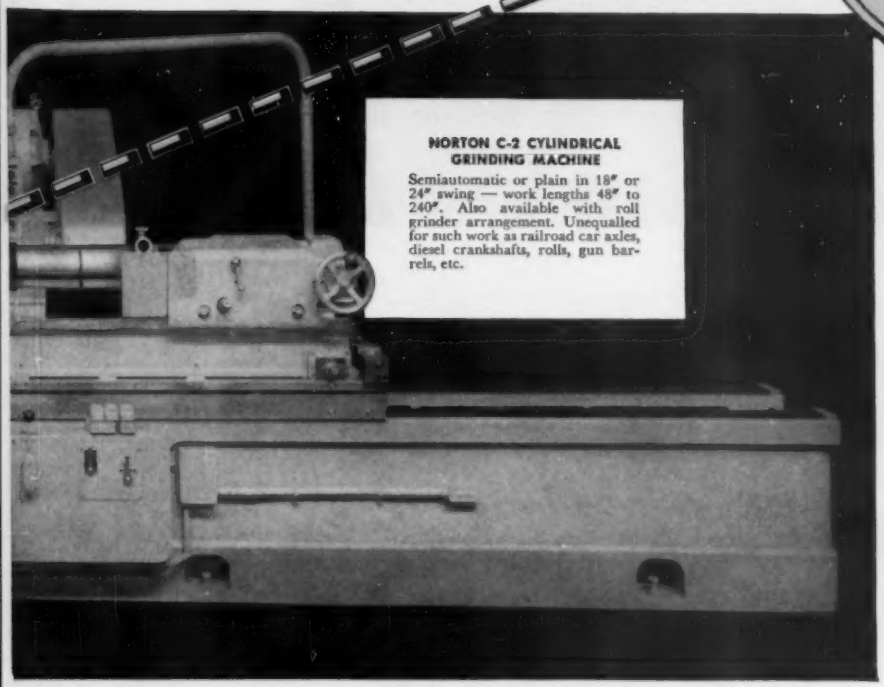
Easy To Set Up And Operate. All controls in front for minimum set-up time, quick change-over and no reaching by operator. Graduated wheel hand feed indicates feed. "Click-counter" signals adjustment for each .0001" reduction in work diameter. Table-truing and grinding speeds may be pre-set, and obtained by selector lever.



Easy To Maintain. All maintenance points on outside. Pumps, motors, filters, lubrication valves and all reservoirs easily accessible. Electrical controls grouped for easy inspection and enclosed for protection.

that can produce

bigger profits for you



The new Norton C-2 Cylindrical Grinder is available in 3 arrangements: Plain Semiautomatic Roll

Faster cutting . . . quicker set-up . . . easier operation . . . less down time

This is the kind of grinding machine you expect from Norton — one that's tops for accuracy, production rate and ease of operation.

The new C-2 gives you more heavy production because it works more of the time — and works faster and easier.

When arranged for Semiautomatic operation all your operator does is to move a single lever for automatic grinding to exact size and finish.

When arranged as a Roll Grinder the famous Norton tilting wheel head mechanism is supplied. This moves the grinding wheel contact point away from or toward the axis of the roll as the roll is traversed past the wheel face.

Remember: only Norton offers you such long experience in both grinding wheels and machines, to help you produce more at lower cost.

Your Norton Representative will be glad to give you all the facts on the new C-2 and to discuss your grinding problems. Or write direct to NORTON COMPANY, Machine Division, Worcester 6, Mass.

To Economize, Modernize With **NEW**

NORTON

GRINDERS and LAPPERS

Making better products . . . to make other products better

District Sales Offices: Worcester • Hartford • New York (Teterboro, N. J.) Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

do you want low-cost corrosion or contamination

Acetone • Borax • Calcium Carbide • Calcium Carbonate • Calcium Chloride (Flake) •
Ethyl Alcohol • Ethylene Glycol • Glycerine • Insecticide Concentrates •
Soap and Soap Lye • Soda Ash • Sodium Bicarbonate • Sodium Silicate •

CF&I LECTRO-CLAD* Nickel Plated Steel Plates will give it to you

Yes, you can get low-cost, yet effective protection against contamination and corrosion with all these chemicals...and many more!

Effective in heavy industrial applications where the corrosion rate does not exceed 0.0015 inches per year, CF&I LECTRO-CLAD Nickel Plated Steel Plates successfully combine the corrosion and contamination resistance of nickel and the economy and strength of carbon steel.

That's because CF&I LECTRO-CLAD is made by the Bart Process, which consists of electrodepositing a heavy layer of 99% pure nickel on a carbon steel plate. This process results in a permanent bond between the nickel and the steel base. The nickel plating is customarily supplied in the 8-10 mil range; however, it can be plated up to 15-20 mils, if specified.

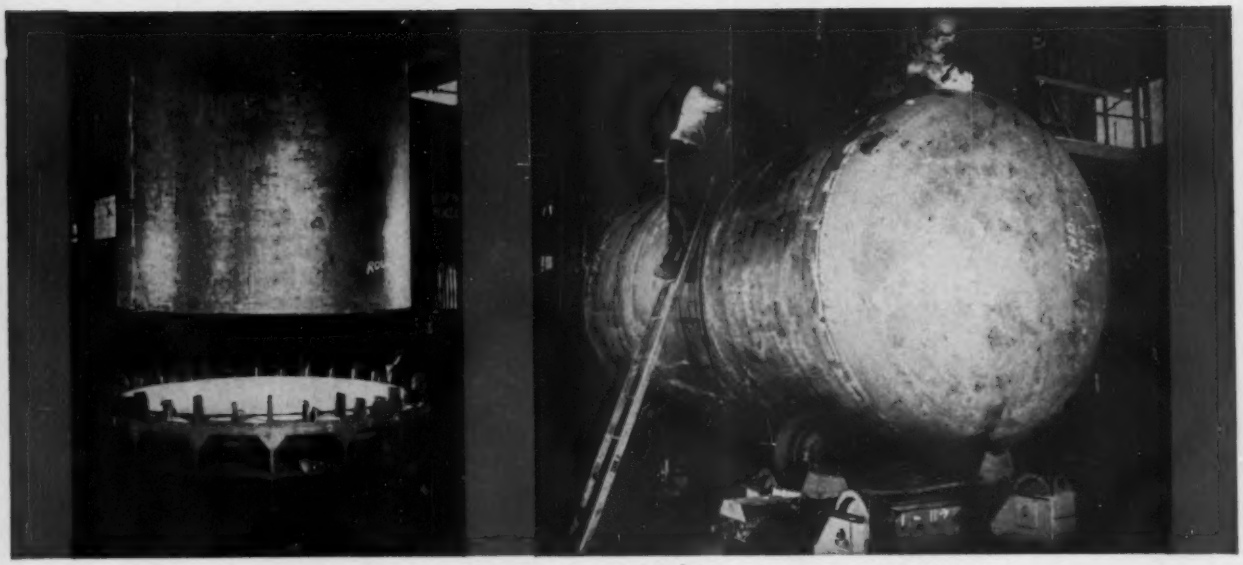
What's more, CF&I LECTRO-CLAD Nickel Plated Steel Plates are easily fabricated without costly special equipment. Just use regular shop equipment and bend it...weld it... roll it—the protective nickel layer will not check, spall or flake!

Ask our nearest sales office for the complete story on economical, effective, easy-to-fabricate CF&I LECTRO-CLAD Nickel Plated Steel Plate today. Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

*NICKEL PLATED BY THE BART LECTRO-CLAD PROCESS

protection against with these chemicals?

Caustic Soda • Chlorinated Hydrocarbons • Cold Hydrofluoric Acid • Dibutyl Phthalate
Methyl Alcohol • Petroleum Catalysts • Phenol • Potash • Resin Plasticizers • Salt
Sodium Sulphate • Titanium Dioxide • Tricresyl Phosphate



Assembling a tank fabricated from CF&I LECTRO-CLAD Nickel Plated Steel Plates.

3798

Claymont Steel Products

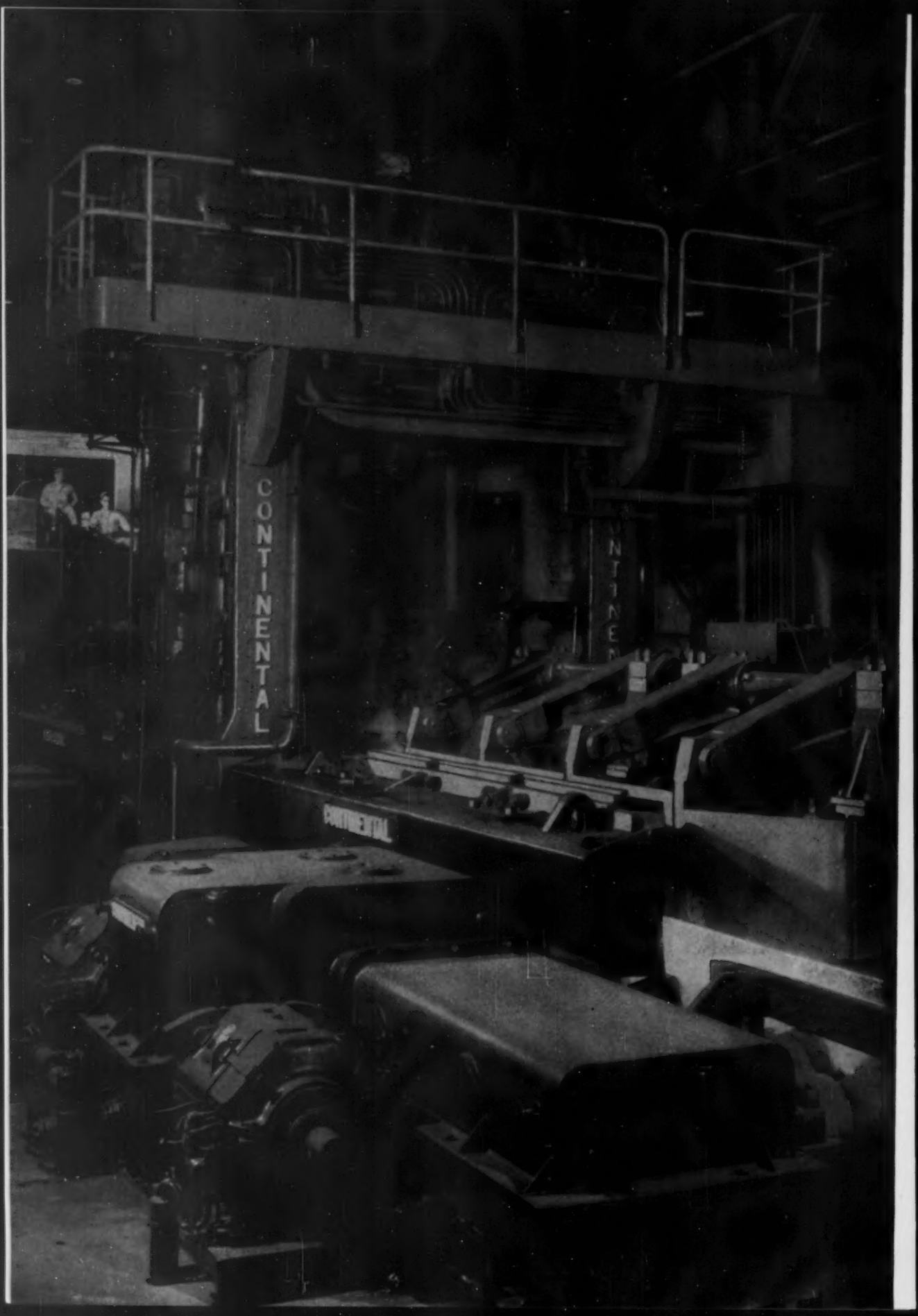
CF&I

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

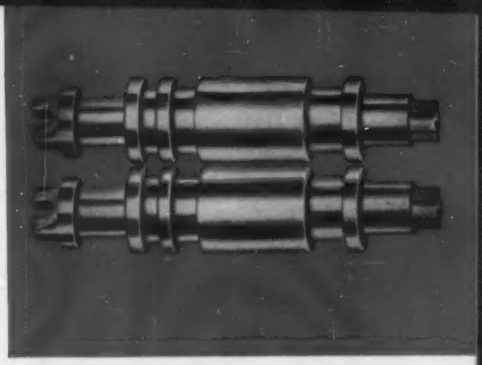
Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CF&I OFFICES IN CANADA: Montreal • Toronto CANADIAN REPRESENTATIVES AT: Edmonton • Calgary • Vancouver • Winnipeg

OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Fabricated Steel Parts • Flanged and Dished Heads • Alloy Steel Plates • High Strength Low Alloy Steel Plates


CONTINENTAL
CONTINENTAL

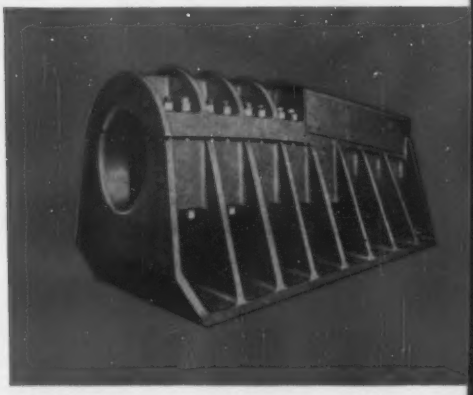
CONTINENTAL 40-inch, 2-high reversing blooming-slabbing mill in the Fairless Works of the United States Steel Corporation.



ROLLS—iron, alloy iron and steel rolls for all types of rolling mills.

BLAW-KNOX

makes what it takes to handle tough blooming-slabbing operations

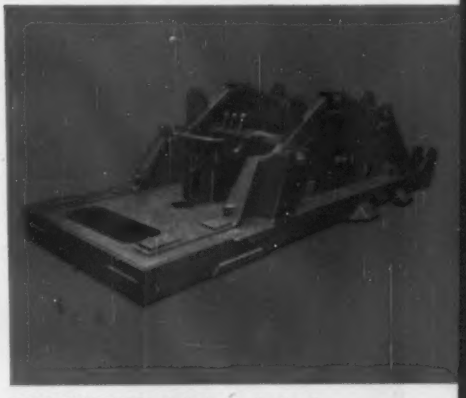


CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

In operation as an intermediate mill for subsequent rolling, this rugged Continental 40-inch reversing blooming-slabbing mill is providing excellent performance in the United States Steel's Fairless Works.

Variations of the basic design of this mill are built by Blaw-Knox to serve as break-down mills for billet and bar mills, rail and structural mills, and merchant mills.

Blaw-Knox designs and builds complete rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.



WELDMENTS—fabricated steel plate, or cast-weld design.

50th Anniversary
BLAW-KNOX
1906-1956

CONTINENTAL

BLAW-KNOX COMPANY

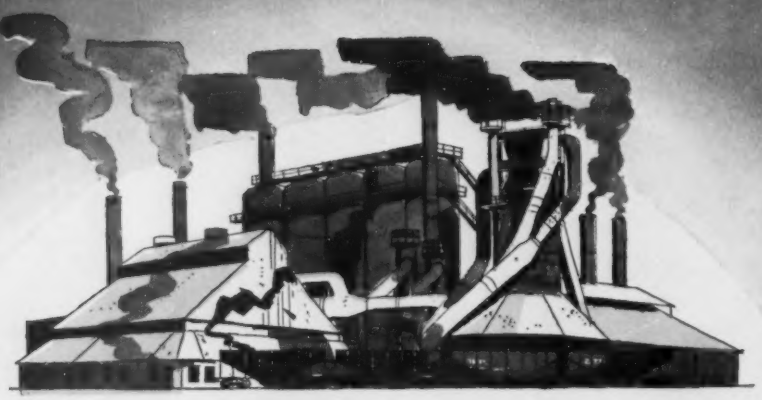
Foundry and Mill Machinery Division

Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment

expanding mill standardizes on



To meet ever-increasing demands for specialized steel, an eastern mill has completed an extensive expansion program consisting of a new reversing cold mill and two auxiliary lines. Significantly, Allis-Chalmers control is utilized in all three operations.

Progressive mills are taking advantage of Allis-Chalmers experience in engineering, building and applying steel mill control — control that provides smooth, precision performance — control that affords maximum production and top quality with a minimum of outage time and maintenance. Get all the facts about Allis-Chalmers mill control. See your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

PICKLING LINE

The Allis-Chalmers control on this line provides an exceptionally wide speed range of more than 15 to 1. Power for the line comes from three separate m-g sets employing magnetic amplifiers for quick response. Complete synchronization between entry, processing and delivery sections permits continuous mill operation.

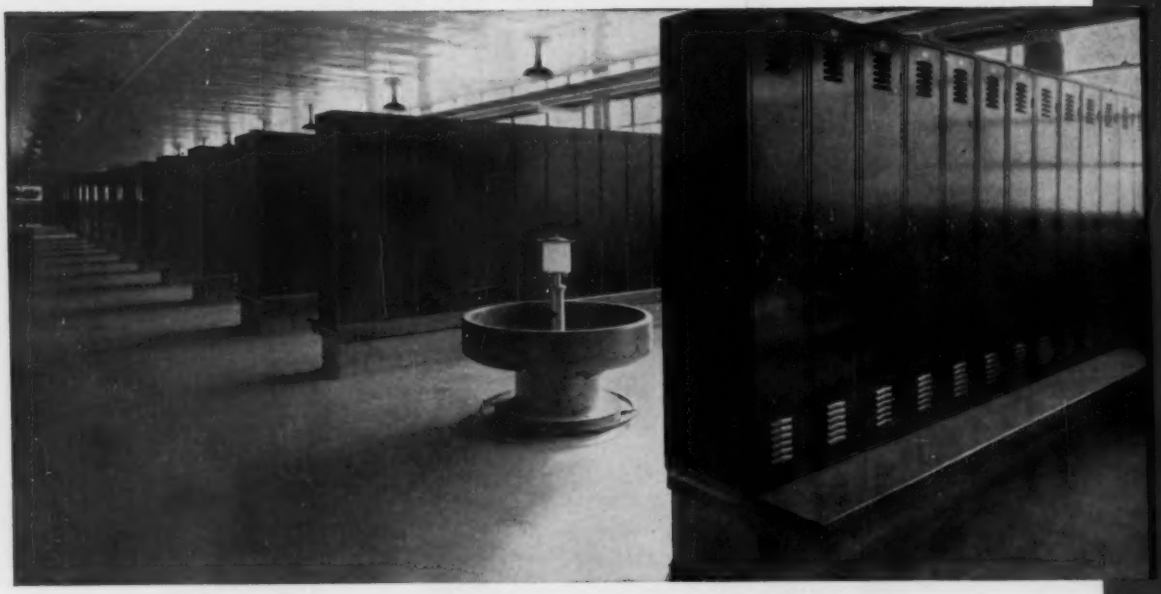
ANNEALING LINE

This control features power-type magnetic amplifier regulation for accurate control and low maintenance. Variable voltage power is obtained from a six-machine m-g set. Speed regulation of .5% assures constant strip speed and a resulting uniformity of high quality steel. Open-type control boards utilize Allis-Chalmers components especially designed for mill operation.

LIVE BETTER ELECTRICALLY

ALLIS-

For your new factory ... or addition



Which locking system do you prefer?

Republic Steel Lockers offer three types

Combination ... padlock ... or key operated ...Republic has 'em all—including Key-Control.

And you can have your choice of these protective systems in any one of many types and sizes of standard steel lockers for every conceivable storage requirement.

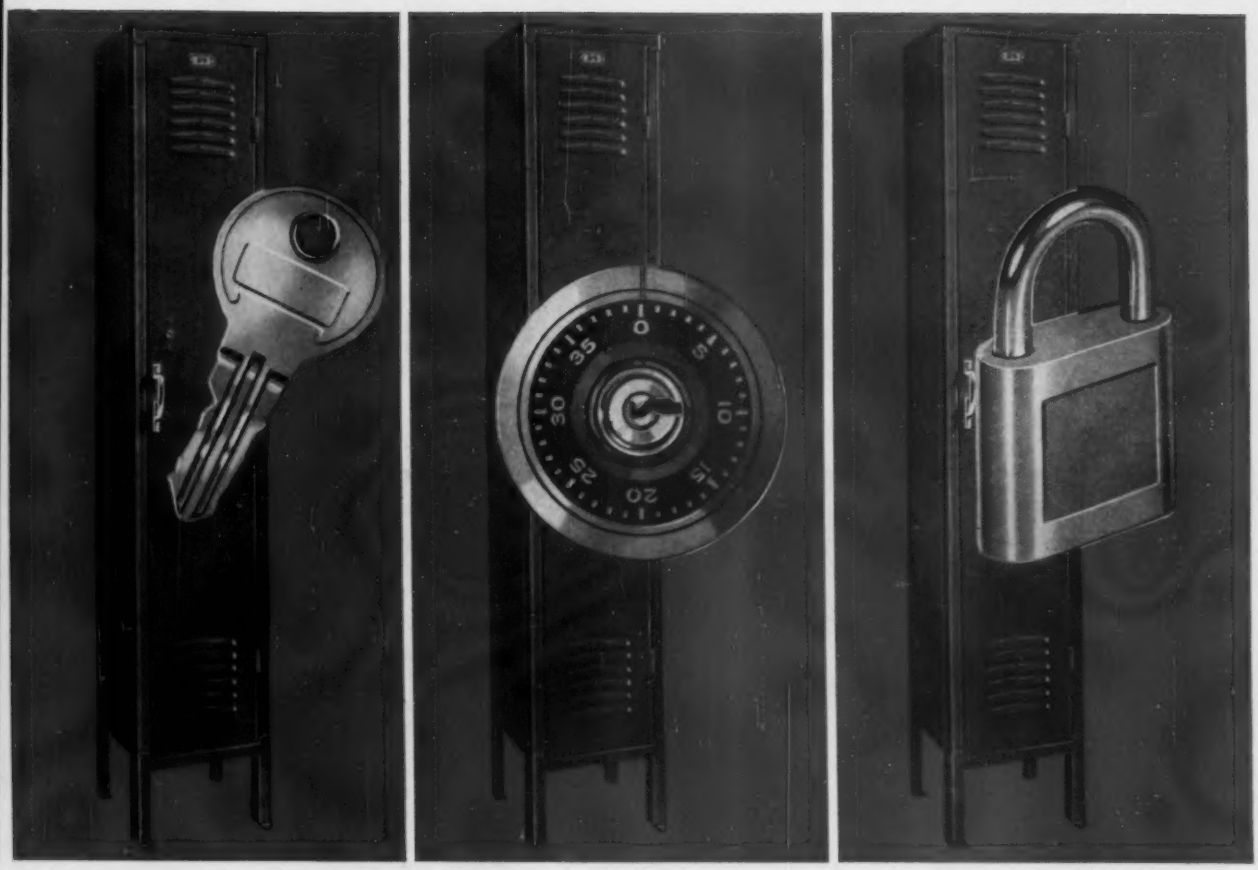
Through more than 65 years, Republic's Berger® Division, the world's biggest manufacturer of lockers, has completed more installations than any other maker. Here is experience you can always depend on when you want the best in lockers.

Berger offers business and industry a complete planning and installation service, too. A service which supplies technical planning and engineering assistance, then assumes full responsibility for proper installation—right down to the final bolt. Get all the facts from your Berger representative, or send coupon for booklet giving details, specifications and prices.

REPUBLIC

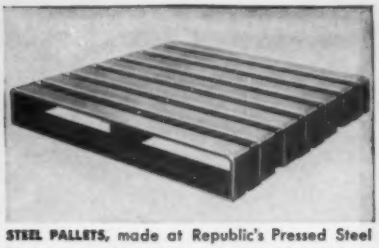
REPUBLIC STEEL

World's Widest Range of Standard Steels



These Republic products can be an important part of your operation

PALLET RACKS permit convenient storage of bulky, irregular materials that are normally unstackable. Odd lots are stored with space-saving economy. Simply palletize them all, and load pallets on rack. The rack, not the load, bears all the weight. Two-way entry permits loading and unloading from either side. Republic Pallet Racks, shipped knocked down, are easy to assemble. Sizes are available to fit your standard pallets.



STEEL PALLETS, made at Republic's Pressed Steel Division, are designed to eliminate the nuisance and expense of repairing broken deck boards, protruding nails, split stringers and joint failures. They're strong, rigid, have no sharp edges or projections to damage containers or workmen. Republic Engineers will help you develop a design that meets your specific requirements. Send coupon for literature.

WEDGE-LOCK STEEL SHELVING, the world's strongest, is designed to gain strength as the load increases, thus permitting higher stacking without distortion or instability. Another product of Republic's Berger Division, Republic Wedge-Lock permits efficient use of overhead space. Wedge-Lock is easy to assemble; and later rearrange to suit changing needs. Mail coupon below for additional information on complete shelving line.

STEEL
and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-1798
3104 East 45th Street
Cleveland 27, Ohio

Please send me additional information on:

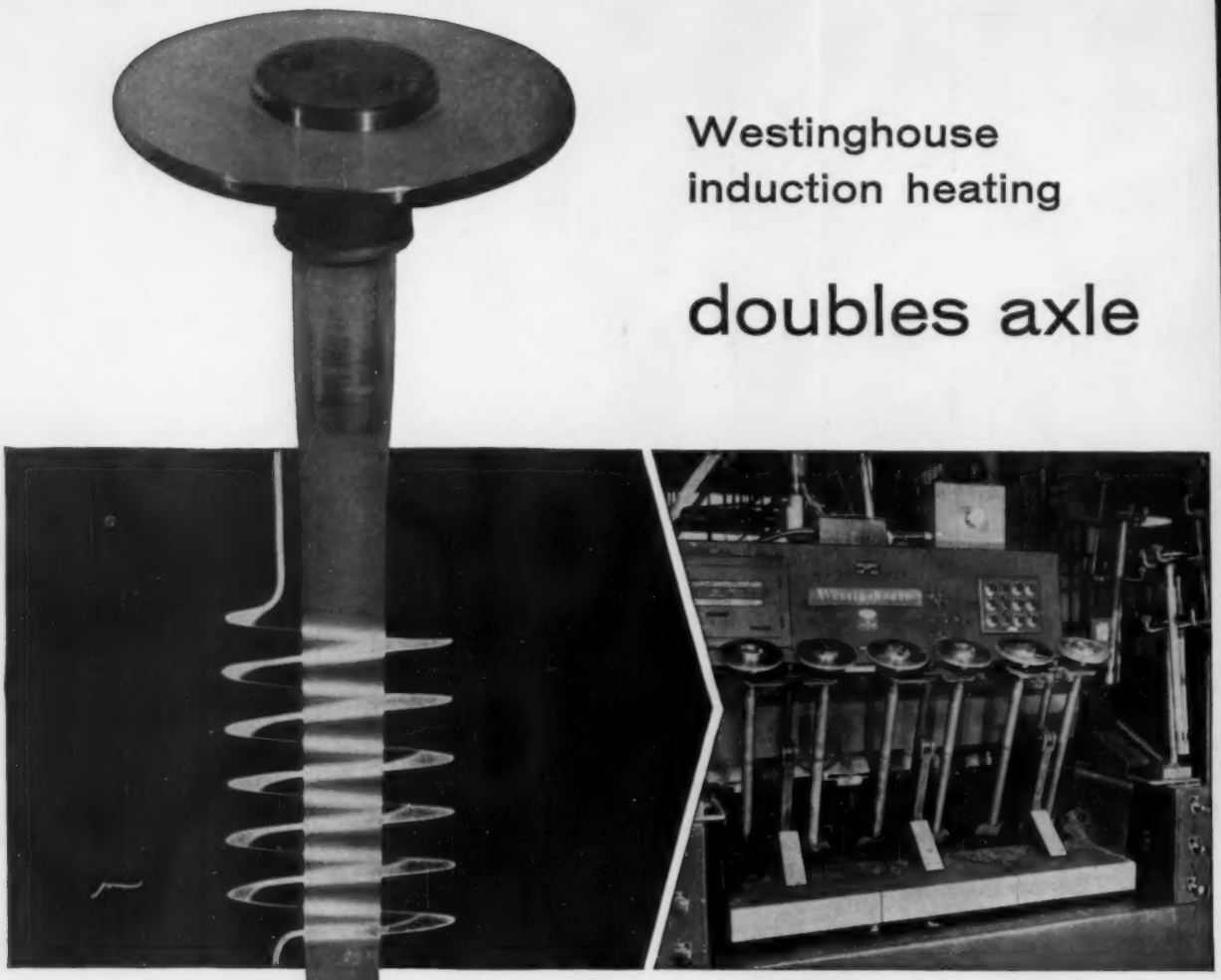
☐ Lockers ☐ Pallets
☐ Shelving ☐ Pallet Racks

Name_____

Address_____

City_____ Zone____ State_____

Westinghouse induction heating doubles axle



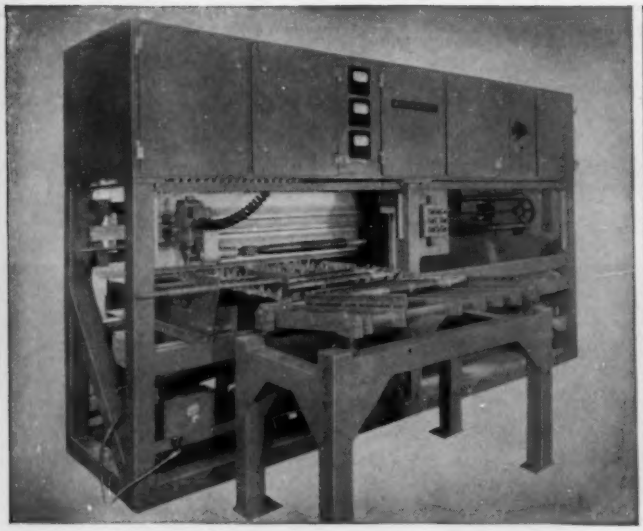
1. A single operator surface-hardens 6 rear-axle shafts at each setup of this Westinghouse induction unit. Production per hour totals 210 shafts.

R. E. Cheek
Manager, Induction Heating Department

"Three different axle-hardening applications," reports R. E. Cheek, "show a slice of Westinghouse experience in solving production line heat-treating problems. Dependability of Westinghouse induction equipment, for example, protects production timing and holds maintenance to a minimum. Results are measured, too, in three important profit advantages."

1. Twice the axle fatigue life is obtained from lower cost, plain carbon steels. No more need for costlier alloys.
2. Lower carbon steels lengthen tool life . . . reduce machining and replacement costs.
3. Axle shaft distortion is minimized by rapid induction heating and quenching.

fatigue strength . . . lowers cost



2. As many as 33 axle shafts up to 42 inches long and weighing up to 100 lbs. are surface-hardened by this Westinghouse induction equipment.

3. Westinghouse general-purpose induction scanner handles shafts up to 30 inches long, 80 lbs. weight, for surface-hardening and quenching.

Many other factors, such as savings in floor space, rapid start-up, and cooler more productive working conditions add to the high efficiency of each installation.

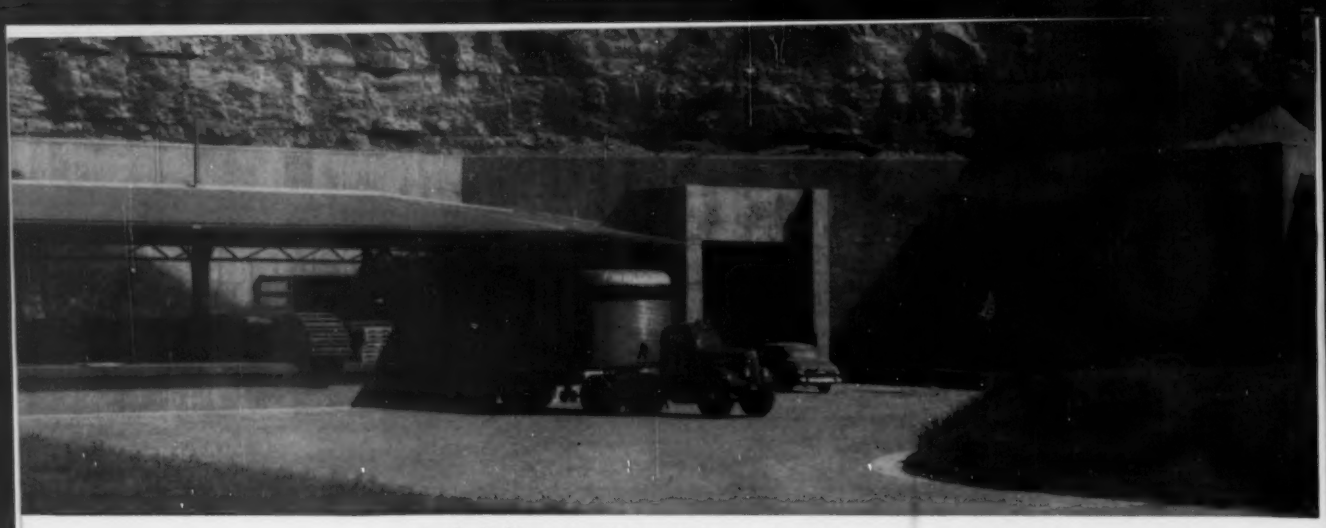
A profit return for you? Westinghouse induction-heating experience can show you production problems turned into profitable solutions for hardening, annealing, joining, or forging. Why not call on your local Westinghouse industrial heating sales engineer? He'll bring you expert problem solving and complete service. Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Penna. J-10455-X

The Westinghouse Heat-Treating Family

GAS • ELECTRIC • INDUCTION

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

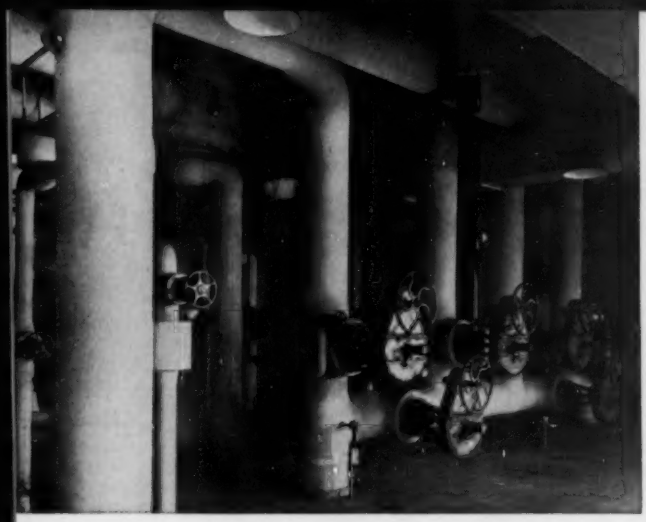


In the Refrigeration System of the Inland Cold Storage "cave" near Kansas City are more than three miles of National Seamless. Ranging from ⅜-inch to 10-inch dia., the pipe circulates brine and ammonia.

Backbone of a

Buck Equipment Corporation Hoisting Machines like this are available with towers up to 150 feet in height. Constructed of Shelby Seamless Mechanical Tubing, the sturdy, slender tower unfolds like a jack-knife—raises and lowers in just over 2 minutes. The platform zooms up its vertical track at 140 feet per minute.

10,200 Tons of 10¾" National Seamless are being used in the world's first coal-carrying pipeline. A slurry mixture of coal and water will be pumped through the unique line at the rate of 1,200,000 tons per year. The line runs from Cadiz, Ohio to Cleveland Electric Illuminating Company's East Lake, Ohio, plant.



New England's Most Modern Power Station employed 25 miles, or 700 tons, of National Seamless Pipe in its construction. The Salem Harbor Station uses 250,000,000 gallons of sea water per day to condense steam for conversion to electric power. Annual output exceeds 1,000,000,000 kilowatt-hours.

The National Seamless Method of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No longitudinal welds . . . no weaknesses.

Hundred Industries . . .

NATIONAL SEAMLESS PIPE AND TUBES

Ever see a ton of bricks soaring up a thin vertical track of tubing at 140 feet a minute? Or a pipeline that carries coal from the mine to potential customers a hundred miles away? These and many more technical miracles are realities today—with the help of National Seamless Pipe and Tubes.

The versatility of National Seamless is evident everywhere. It can be versatile because it is *so strong, so safe, so workable.* Its uniformity and dimensional accuracy are unquestioned. And National Seamless is available in a wide range of steel analyses, wall thicknesses and diameters. Every foot is produced to exact standards by the world's largest manufacturer of tubular steel products.

National Seamless might be just the answer to your tubular problem. Get in touch with National Tube. We will be pleased to help you in any way we can.

The New Texas National Bank at Houston employs National Seamless Pipe in a wide range of sizes for its vast heating and air-conditioning system. Sizes from 4" to 12" O.D. are used for chill and hot water lines, while 14" O.D. pipe forms part of the steam-handling system. 16" pipe is used for carrying condenser water.

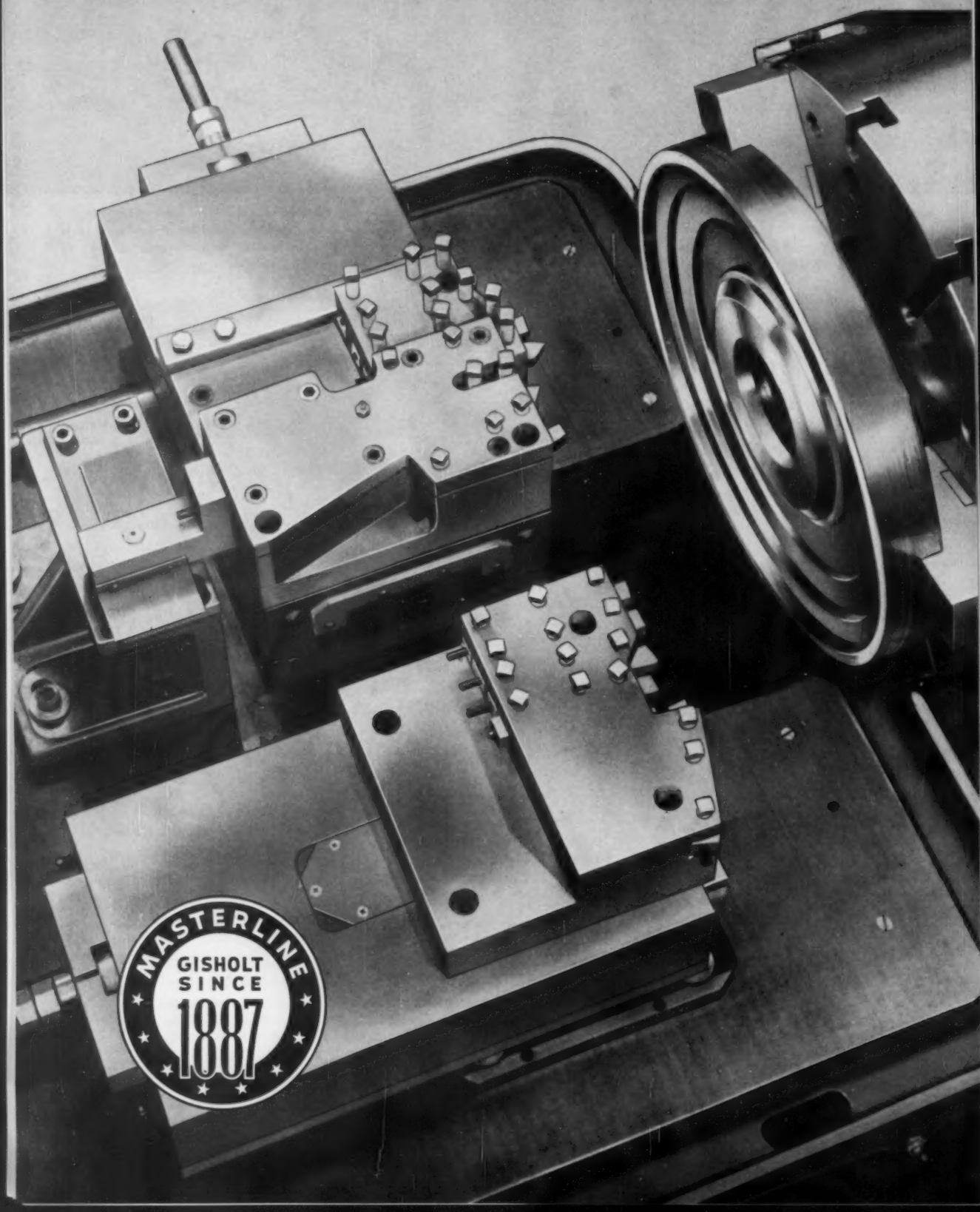
NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **NATIONAL SEAMLESS PIPE AND TUBES**

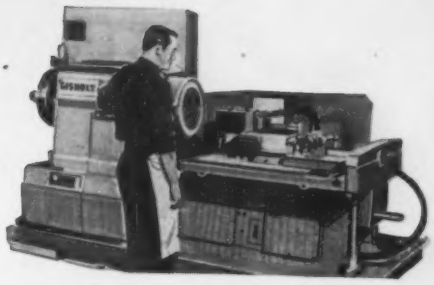
UNITED STATES STEEL

This New GISHOLT MASTERLINE

SIMPLIMATIC AUTOMATIC LATHE may save you



the cost of a special machine



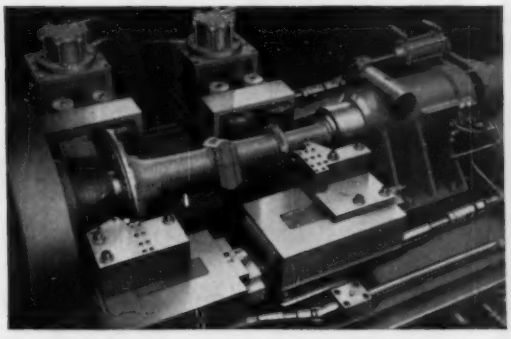
HERE'S WHY: the machine itself—headstock, bed, extra wide platen table—is *standard!*

Yet with the new Gisholt MASTERLINE Simplimatic Automatic Lathe, you have ample space for an *infinite* number of slide and tool arrangements. You can use front, center, rear and auxiliary slides—all moving at different feed rates—carrying enough tools to machine a maximum number of surfaces in a single chucking. All slides are easily mounted at correct angle to the work—keeping tool overhang to absolute minimum for increased rigidity and increased accuracy. And with the Simplimatic's table feed, tools can engage with the work or perform additional machining operations before actual slide movements begin.

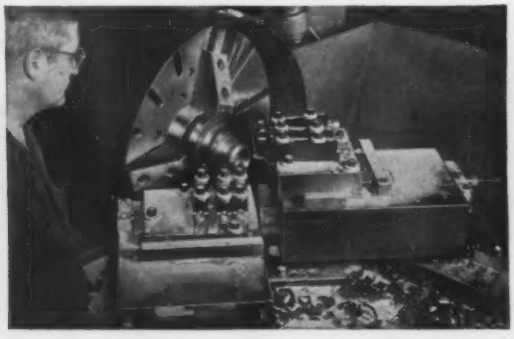
Because the Gisholt Simplimatic is a standard machine, it is *easy* to set up, operate and maintain. In many cases, the automatic cycle frees the operator to handle additional units or perform other work. And the basic design is readily adapted for work-handling devices, which even further simplify the operator's job and speed production!

Ask your Gisholt Representative to show you how efficiently the Simplimatic can handle your problem parts—using a simple, standard machine transformed by addition of standard tool slides, tool blocks and chucking equipment—performing *special* machine functions at *standard* machine prices! Call him today for full information on the Simplimatic!

Simplimatic setup for machining both ends of tractor rear axle housings in one chucking. Four tool slides are used, two at the front and two at the rear of the platen table. Machining includes turning and chamfering, forming and straddle-facing, with tool relief provided for facing tools on the rear tool blocks.



Six different sizes of tough steel oil well cutter bits are handled with ease and efficiency by this tooling setup. All slides and tools are placed at correct angle to the work. Tools are mounted on riser plates, permitting pre-setting for quick change-over and adjustment. Rigid support eliminates chatter on heavy forming cuts.



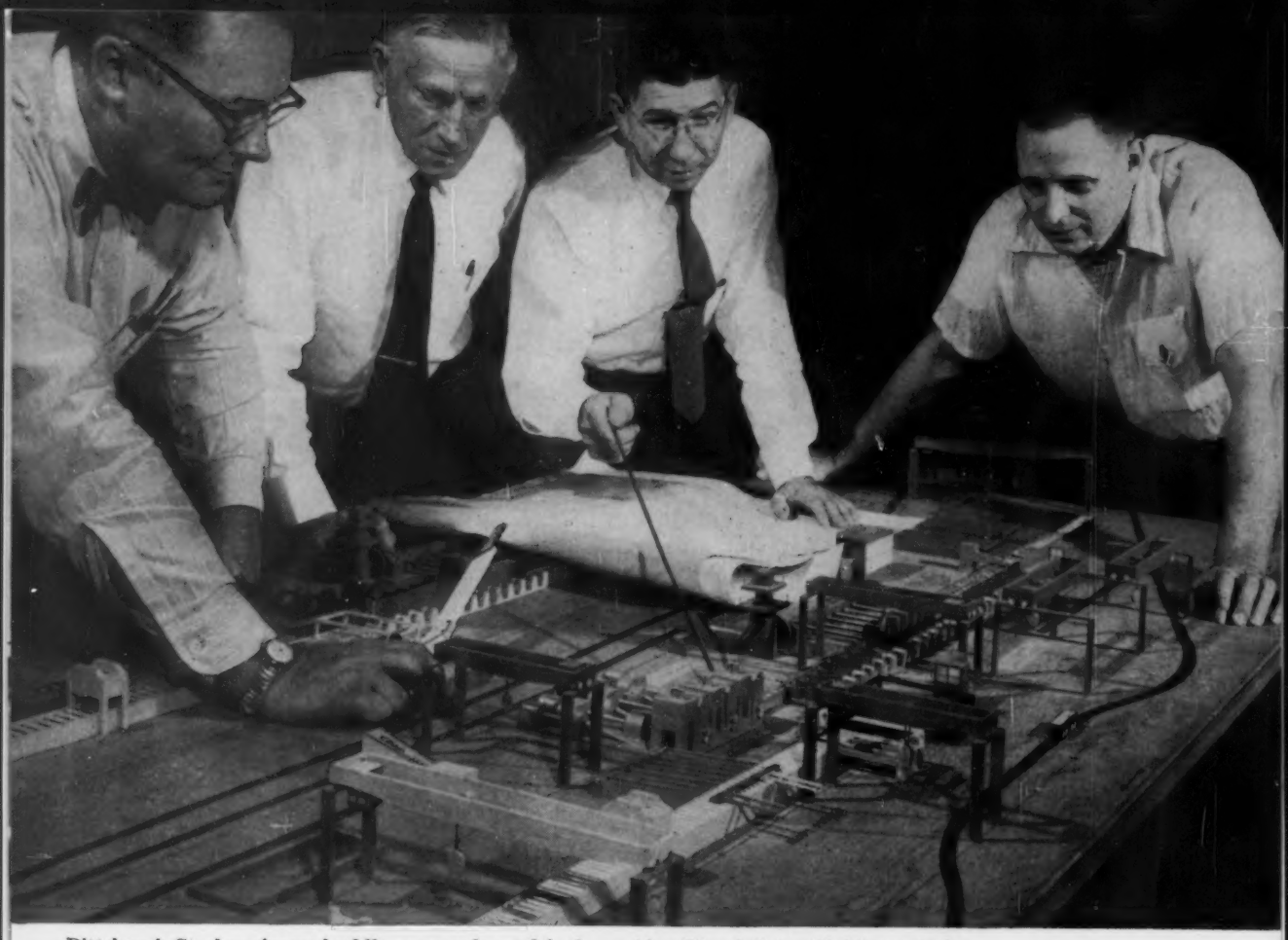
READY NOW! Write today for new Catalog 1159-A on Gisholt MASTERLINE Simplimatic Automatic Lathe. Fully illustrated—shows 31 typical jobs.

GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS



Pittsburgh Steel engineers huddle over scale model of new $6 million billet mill. It's part of . . .

Still More PROGRESS At Pittsburgh Steel

Glowing hot billets, or tube rounds like that pictured above, will emerge from the new billet mill in ever increasing quantities as a result of the current expansion program.

New Billet Mill Slated For Immediate Construction

Construction started December 1 on Pittsburgh Steel Company's newest expansion project—a $6 million billet mill which will rank with the finest of its type in the steel industry.

The new six-stand, continuous, 30-inch billet mill is scheduled for operation late next year. Besides increasing Pittsburgh Steel's capacity for making tube rounds and billets, the newest project will give further assurance of top quality steel.

The new mill—with three vertical and three horizontal mill stands in a straight line—will roll blooms from 9 x 10 inches down to 4-inch squares and 3⅝-inch rounds.

• **Fifth Project**—this latest project follows a four-phased $15-million dollar improvement program nearing completion. Thousands of Pittsburgh Steel customers have already begun to reap benefits in the form of wider product ranges and improved quality in Pittsburgh Steel's products.

New fabric machine was first project completed.

The four phases of the project are:

- Nineteen new by-product coke ovens which have increased coke producing capacity by 25 percent.
- Modernization of blast furnaces to give Pittsburgh Steel fully modern iron-making facilities.
- Installation of a new 96-inch wire fabric machine to greatly improve the mesh and fabric lines available.
- In addition, the enlargement and rebuilding of 12 open hearth furnaces is now more than 80 percent completed. This work will increase basic ingot capacity by 180,000 tons a year.

The entire program will be completed late in 1957 to give Pittsburgh Steel a 14 percent increase in basic capacity.

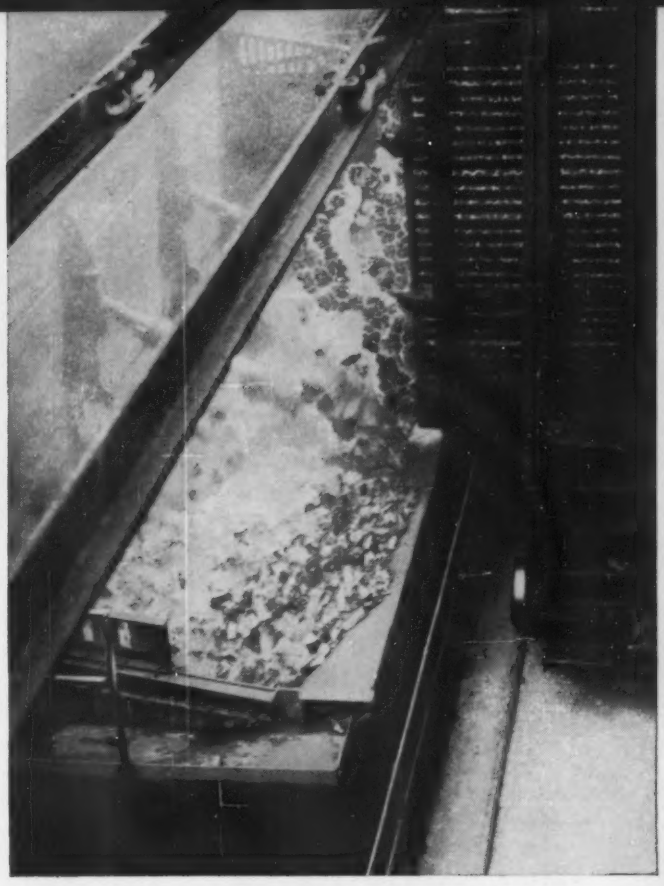
While the industry is expanding total capacity 11 percent in that three-year period, Pittsburgh Steel's 14 percent expansion will be completed in about a year and a half.

And the current program follows closely on a $65 million Program of Progress which made "a new company" of Pittsburgh Steel.

Keeping in the vanguard of this industry-wide move to give America the steel it needs has helped Pittsburgh Steel serve its customers with a wider range of steel products than has ever been available in the company's history.

Whether you need hot and cold rolled sheet and strip, coated or uncoated strip specialties, merchant trade goods, fine wire specialties, manufacturers wire, mechanical seamless tubing or oil country goods, Pittsburgh Steel offers you superior products and dependable service.

You can get in touch with a Pittsburgh Steel engineer by calling any district office. He's waiting to discuss your steel problems. Call today.



Nineteen new coke ovens already are in production.

Here's first steel from one of improved open hearth furnaces.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pennsylvania

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

GET A BETTER RECOVERY

...of manganese with MANTEMP ferromanganese

This new exothermic manganese alloy allows open hearth melters to make higher additions of manganese to the ladle (up to 1.5% manganese). Thus you get:

- 10% to 15% higher recoveries of manganese.
- More consistent manganese recoveries with fewer missed heats.
- 15 to 20 minutes less furnace time for low-carbon heats.

The strong exothermic action of MANTEMP ferromanganese sharply reduces segregation of manganese within the ladle. In addition, its unique exothermic reaction allows higher and more consistent recoveries of aluminum when aluminum is added as an alloying element.

Your nearest ELECTROMET office will be glad to give you further information concerning the high and medium-carbon grades of MANTEMP exothermic ferromanganese.

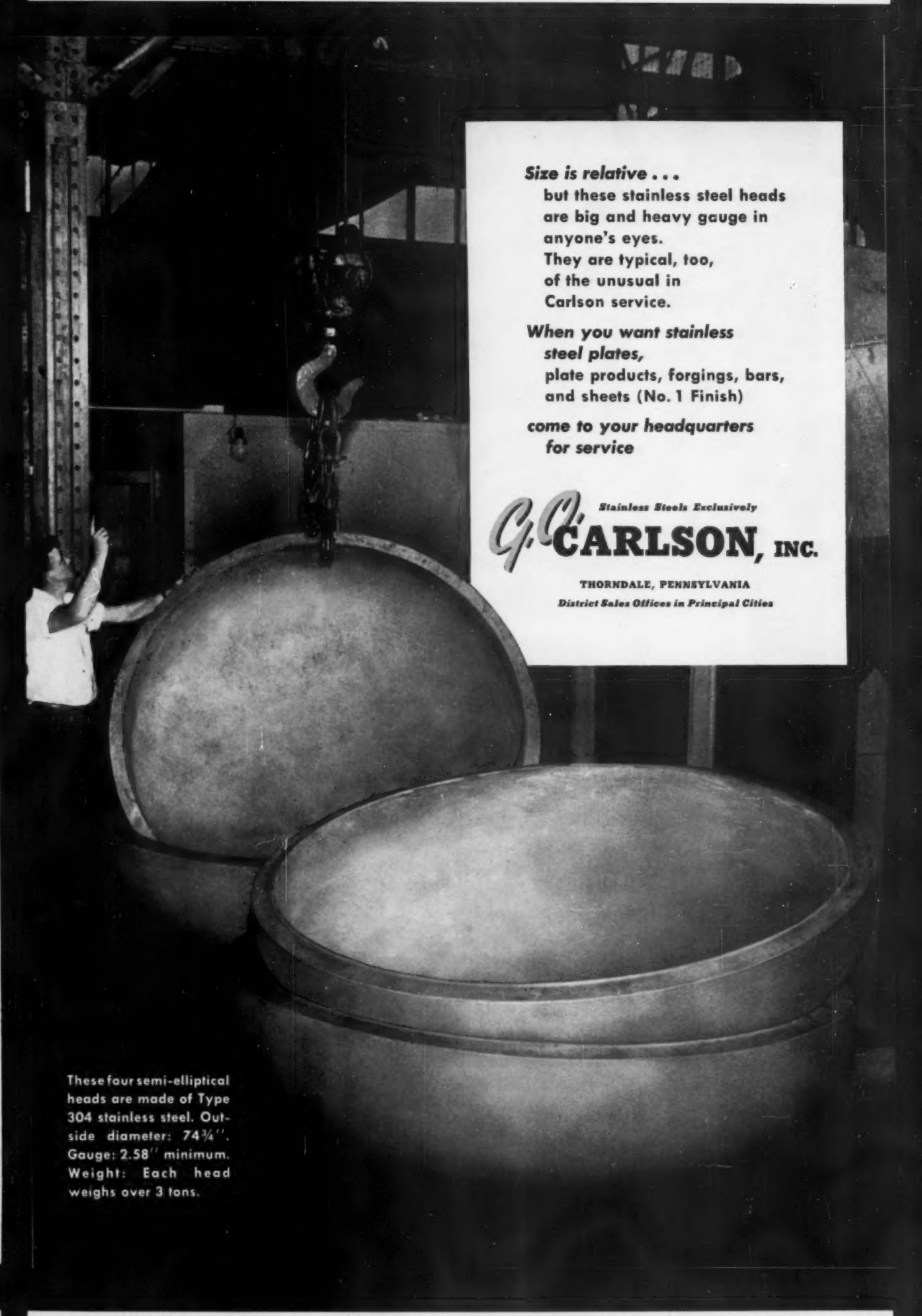
ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N. Y.

Offices in 10 major cities
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited

METALS DO MORE ALL THE TIME ... THANKS TO ALLOYS

Electromet

The terms "Electromet" and "Mantemp" are trade-marks of Union Carbide.



Size is relative . . .
but these stainless steel heads are big and heavy gauge in anyone's eyes. They are typical, too, of the unusual in Carlson service.

When you want stainless steel plates,
plate products, forgings, bars, and sheets (No. 1 Finish)

come to your headquarters for service

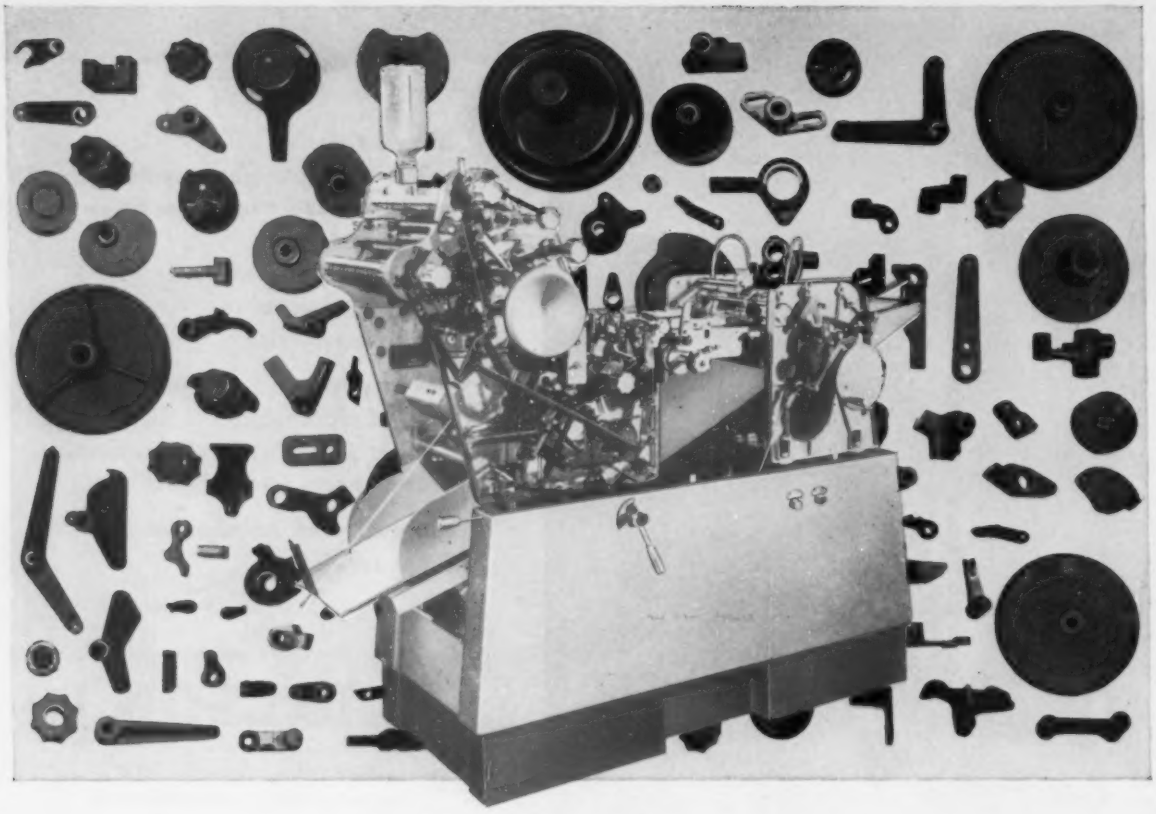
Stainless Steels Exclusively

G. O. CARLSON, INC.

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities

These four semi-elliptical heads are made of Type 304 stainless steel. Outside diameter: 74¾". Gauge: 2.58" minimum. Weight: Each head weighs over 3 tons.



This machine features

OVER 125 SHELL-MOLDED PARTS

produced exclusively with G-E SHELL-MOLDING RESINS

Whitin's *Masterlith* Duplicator* contains over 125 shell-molded parts! And here are the advantages that Whitin gets from selecting shell molding over other foundry techniques:

1. **Smoother finish** that drastically reduces machining, minimizes the need for expensive machining equipment.
2. **Closer tolerances** that enhance *Masterlith* Duplicator performance.
3. **Sounder internal structure** that cuts reject losses.
4. **Precise dimensional reproduction** of intricate shapes.

Whitin uses General Electric shell-molding resins *exclusively* in producing parts for the *Masterlith* Duplicator, relying on them for batch-to-batch uniformity and correctly balanced properties.

*Mfd. by Whitin Business Equipment Corporation, Whitinsville, Mass.

How can shell molding help YOU?

General Electric maintains a shell-molding laboratory in Pittsfield, Mass., to help foundrymen and casting buyers solve problems and evaluate the process. Ask us about it, or write today for a free copy of the *G-E Shell-Molding Manual* which describes and illustrates the techniques and benefits of this new casting method. *CHEMICAL AND METALLURGICAL DIVISION, General Electric Company, Section 6F5D1, Pittsfield, Massachusetts.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

FREE SHELL-MOLDING MANUAL

BEST
BY ANY TURNING TEST

At Taylor Instrument Companies, Rochester, N. Y. "Manufacturing costs cut 74% while contouring stainless at 1000 sfpm to 16 mu-in. finish."

Jones & Lamson turret lathes are built and powered to produce...

MORE CHIPS per tool
MORE PIECES per hour
MORE PROFIT per job

than any other turret lathe of comparable size!

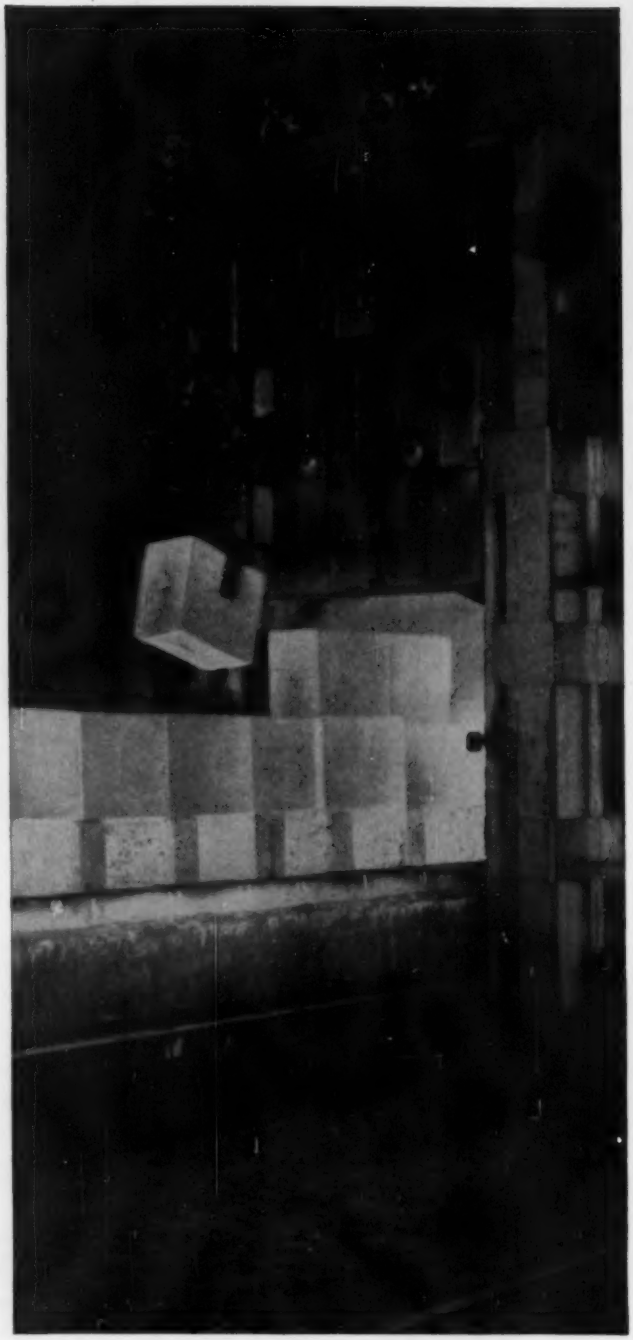
Write Jones & Lamson for details

JONES & LAMSON

the man who needs a new machine tool is already paying for it

JONES & LAMSON MACHINE COMPANY, 511 Clinton St., Springfield, Vt., U.S.A. J&L **MACHINE TOOL DIV.**

Fast, flexible GAS cuts heating cycle, ups production at Heppenstall Company



Heating die blocks for hardening is no longer a 20- to 30-hour operation at Heppenstall Company's Pittsburgh plant. A new, completely automatic program control heating method, with a heating rate 4½ times faster than previously attained, reduces the cycle to only 3 to 4 hours for work loads up to 20 tons.

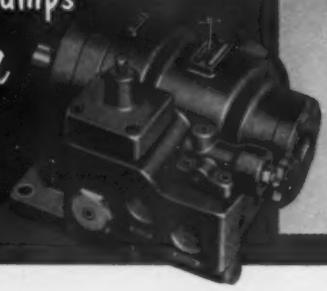
This fast heating is done with patterned radiant heat in a Gas-fired, car-bottom type furnace, designed and built by Selas Corporation of America. The furnace not only increases production rate four to five-fold —as compared with the 12 adjoining, conventional furnaces of approximately the same size—but also achieves this increase in output with 20 percent less fuel per pound of steel heated.

For information on how you can increase production by using Gas, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results you get with Gas and modern Gas-fired industrial equipment. *American Gas Association.*

Do You Want To Save Horsepower and Heat?

VICKERS

Two-Pressure Oil Hydraulic Pumps Require Less Power for Two-Pressure Circuits



Automatically Provide

High Volume @ Low Pressure for fast closing, rapid advance, and rapid return.

•

Low Volume @ High Pressure for feeding, compressing, clamping, and holding.

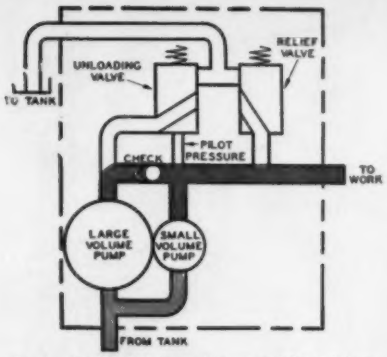


Fig. 1 Combined Delivery of Large and Small Volume Cartridges at Low Pressure

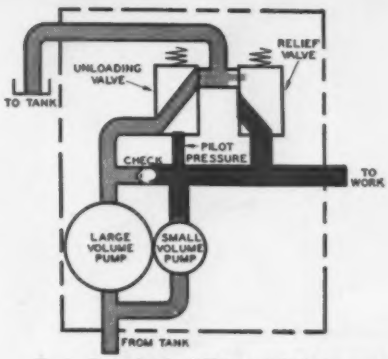


Fig. 2 Delivering Small Volume at High Pressure

Two Vickers Vane Type pumping cartridges are mounted on the same shaft—in the same housing, driven by the same prime mover. One provides a large volume of oil while the other delivers a small volume. These Vickers Two-Pressure Pumps have proved advantageous in a wide variety of applications.

For example, in closing a press or in rapid advance, both pump cartridges work together, supplying maximum volume for quick operation (see Fig. 1). When the press is closed and compression begins, or when the tool goes into feed immediately prior to beginning the cut, the large volume cartridge is automatically unloaded to the reservoir at zero pressure (see Fig. 2). The small volume cartridge alone then provides the lower volume required at high pressure.

These Vickers Two-Pressure Pumps are most economical in power consumption for such two-pressure operation. The reason for this is that a small-volume pump working at full capacity is MORE EFFICIENT than a large-volume pump working at partial capacity. Regardless of momentary delivery, the internal leakage of any pump is proportional to its size and operating pressure. The chart (Fig. 3) shows an interesting comparison between a Vickers Two-Pressure (Two-Volume) Pump and a variable volume vane type pump on a press circuit.

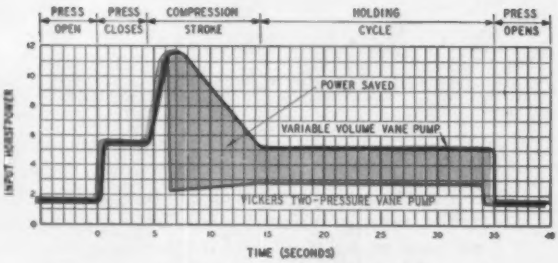


Fig. 3. On this typical press application the saving in power is approximately 50% with a resultant saving in heat in the system.

Like all Vickers Vane Pumps, these two-pressure pumps have the hydraulic balance feature that relieves bearings of all pressure loads (one of the major causes of wear). Cartridge construction enables customer to service in his own plant instead of returning to factory should repairs be necessary. Relief and unloading valves are integral . . . minimizing piping and connections. Complete range of sizes up to 48 gpm. For additional information, ask for Bulletin 54-70a.

6895

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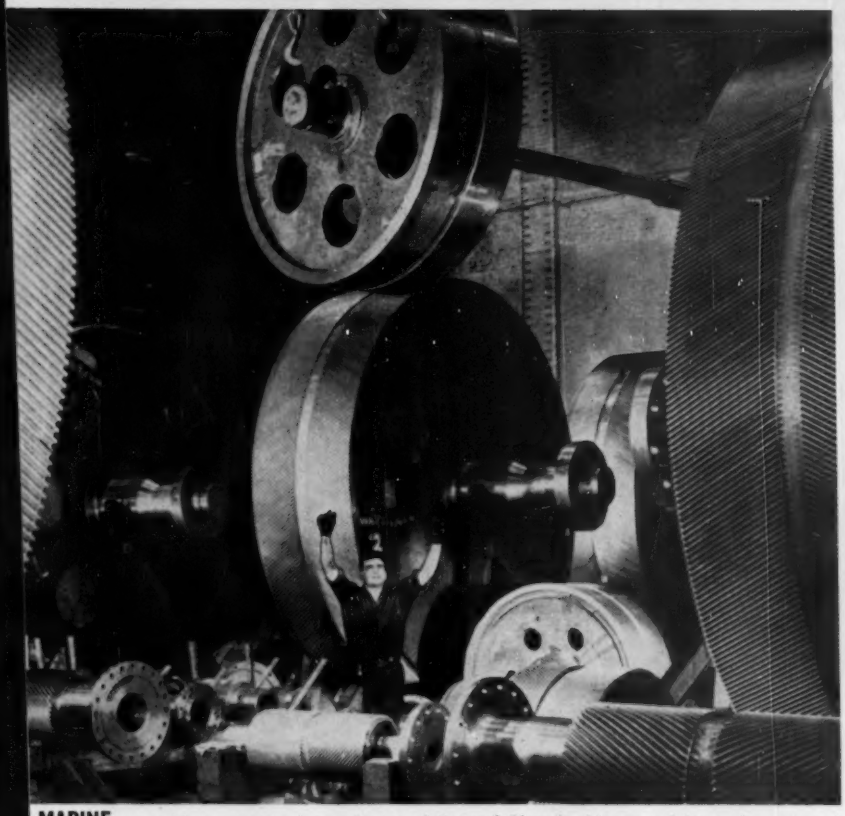
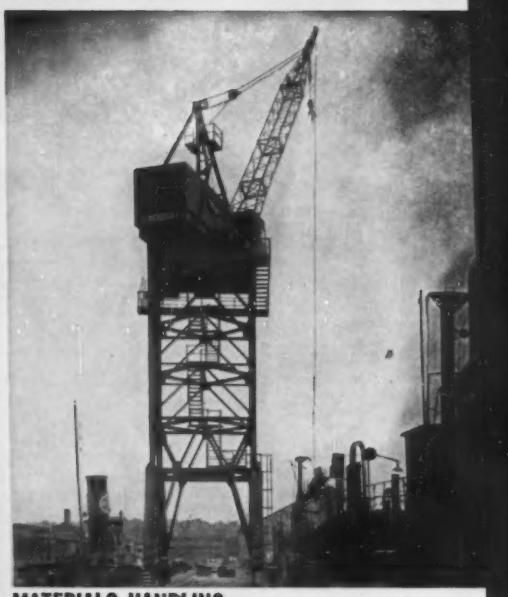
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

BARIUM STEEL—active in America's growth



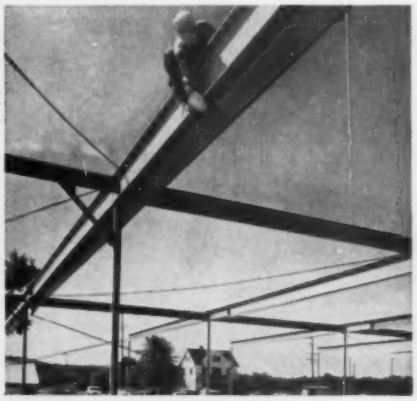
MARINE propulsion gears, an integral part of General Electric ship propulsion units, use steel plate from Barium's Phoenix Iron & Steel Company, Plate Division. These massive web plates are welded to forged steel rims and hubs—the most practical method of construction for large diameter marine gears (up to 16⅔ feet). In addition to steel plate Phoenix also produces structural steel shapes, heavy wall seamless pipe, and turns out large and small steel fabrications.



MATERIALS-HANDLING at this East Coast shipyard centers around the Clyde crane above with its 20-ton capacity, 65-foot reach and mobile 70-foot tower. It's only one of many cranes that Barium's Clyde Iron Works has supplied to this customer. If you've got a materials-handling problem coming up, chances are a Clyde crane, hoist or unloader can give you the lift you're looking for

HIGHWAY builders timed the installation of his 132-ton, 180-foot-long girder fabricated nd erected by Barium's Phoenix Bridge Comany at an incredible 27 minutes. This Phoenixuilt bridge will carry the New England Thruay over the 4-track main line of the New York, ew Haven and Hartford at New Rochelle, New ork. Part of the credit for quick work against tight railroad schedule goes to the Bariumuilt 100-ton Clyde derrick.

roject of New York State Dept. of Public Works. General ontractors: Arthur A. Johnson Corp., MacLean Grove & Comny, Inc.



BUILDING going up here (New Providence, New Jersey) is a new plant for EXCO, Inc. Structural steel comes from Barium's Phoenix Iron & Steel, Structural Division. Elizabeth Iron Works of Elizabeth, N. J. are steel contractors on this job; they find Barium a good company to work with on small as well as large jobs.

CONSTRUCTION of New York's 30th Street Heliport began as this Wiley floating crane with its 110-foot boom slammed the first steel pile down to bedrock. Barium's Wiley Manufacturing Company, the nation's largest manufacturer of floating cranes, built this one for George W. Rogers Construction Corp., contractors for the Port of New York Authority. Wiley also produces work boats and steel barges.

BARIUM
STEEL CORPORATION
A GROUP OF INTEGRATED COMPANIES

Steel producers, fabricators, product manufacturers

For further information on this close knit, alertly managed team of companies—its engineering resources, production facilities or specific products—write for "The Barium Story" to:

25 BROAD STREET, NEW YORK 4, N. Y.

64

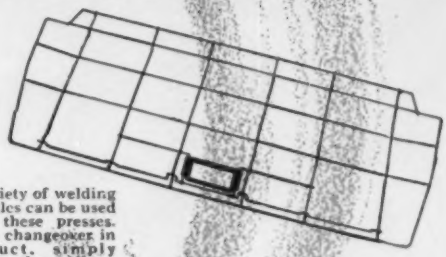
FEDERAL WELDING PRESS . . .

a complete seat frame with every press stroke!

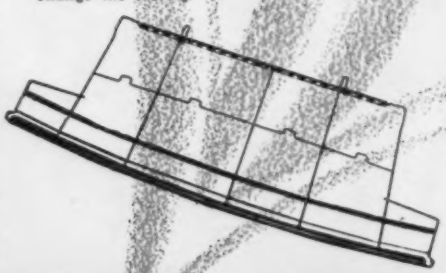
Frames for automobile seat backs and cushions are being resistance welded on Federal Welding Presses at the Great Lakes Spring Division of Rockwell Spring and Axle Co.

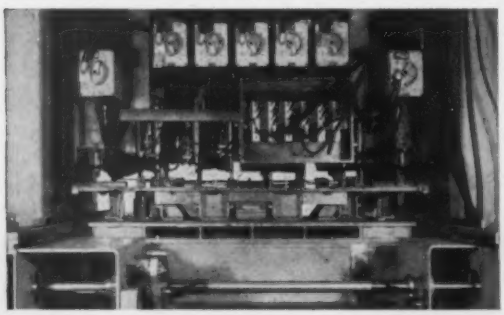
Only Federal can offer single company responsibility in supplying both the mechanical welding press and the welder tooling based on their long experience in both press (Warco) and resistance welder (Federal) manufacture.

There are many manufacturing operations existing today where a mechanical welding press would pay dividends. If you have one of them, why not contact the one company best suited to provide the answer? That's *Federal — First in Resistance Welding*. Welding Press brochure on request.



A variety of welding capsules can be used with these presses. For a changeover in product, simply change the tooling.





Close-up view of welding capsule.

There's no comparison between the old single weld method and this "automated" production line made possible through the Federal Welding Press.

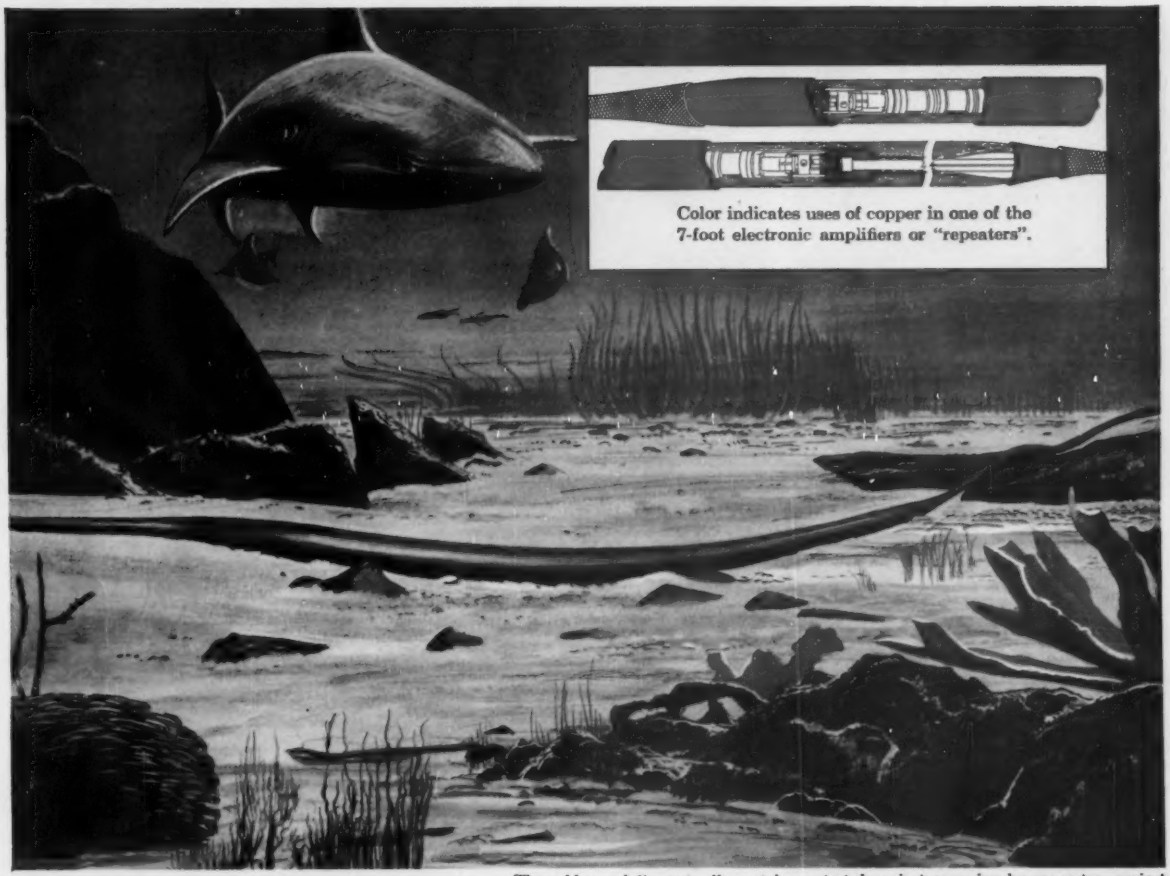
Federal WELDERS

9967

The Federal Machine and Welder Company

WARREN, OHIO

Warco PRESSES



Color indicates uses of copper in one of the 7-foot electronic amplifiers or "repeaters".

The cables and "repeaters" must be protected against corrosion by sea-water, against marine life, against tremendous water pressures. In this situation, copper was the answer!

Phoning Europe? You'll talk over COPPER cables!

Today you can pick up your telephone and call Europe... and your connection will be quick, your conversation clear. Both parties on the line will sound as though they were talking in the same city, not an ocean apart.

COPPER helped make this possible when the first transatlantic telephone cables went into service recently!

Telegraph cables have connected North America and Europe since 1858. But they would not serve for telephoning. Two and a half miles down, voice signals carried only a few miles along the cable. Then they "faded".

This problem was solved by the use of electronic amplifiers or "repeaters". Placed along the new cables at 40-mile intervals, they boost the voice signals . . . *boost them one million times!* It was the electrical conductivity of *copper* and its capacity for miniaturization that made these delicate, complex devices possible!

Copper's flexibility, too, was essential. For the long, tubular "repeaters" had to be rolled over the cable ship's 7-foot drum, as it paid out cable.

* * * *

So today . . . when you pick up your telephone and call Europe, you'll be talking over *copper*.

If progress is essential to your business, remember that copper is essential to progress.

COPPER & BRASS
RESEARCH ASSOCIATION
420 Lexington Avenue, New York 17

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES: Best conductor of electricity commercially available • Does not rust . . . high corrosion resistance • Best heat transfer agent of all commercial metals • Easy to machine, form, draw, stamp, polish, plate, etc. • Welds readily . . . excellent for soldering and brazing

L&N pH Control takes the bite out of acid-tainted waste

The cooling water pictured is intermittently contaminated by the acid operations of a large metals producer. When this occurs, it's piped to an acid leak lagoon, with other wastes such as washwater from acid tank-cars. But when discharged, the combined waste is in close-to-neutral condition, thanks to an L&N pH Control System— electrode assembly, Speedomax® recorder, Control Unit, Valve Drive.

Although L&N pH equipment is taking the bite out of this highly acid effluent, merely purchasing the equipment didn't assure successful treatment. The first and most important step was a critical look at existing treatment facilities via L&N's unique pH Controllability Analysis. This appraisal of "controllability factors" such as flow, concentration, retention, tells L&N specialists whether a process is actually controllable within the pH limits required, or what must be done to *make* it controllable. They translate these data into the answers you need to engineer an efficient treating system.

Process Data Sheet 700(2) explains this unique, successful L&N approach to pH control in industrial waste treatment. Write Leeds & Northrup Company, 4956 Stenton Ave., Phila. 44, Pa.

LEEDS & NORTHRUP
Instruments — Automatic Controls • Furnaces

old methods can't compete

If you do *any* turning you should investigate the New Britain **+GF+** line of copy turning lathes—whether your work calls for sustained production or short runs demanding quick setups. It turns tapers and complicated contours with the same setup used for simple O.D.'s. No need for expensive form tools. Let us demonstrate this completely different approach to turning in a color motion picture demonstration at your desk.

THE NEW BRITAIN MACHINE CO.
Model 11/70
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Copying Lathe
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a long new step forward in bar machine productivity

THE NEW BRITAIN MACHINE CO.
Model 62
Automatic Bar
Machine
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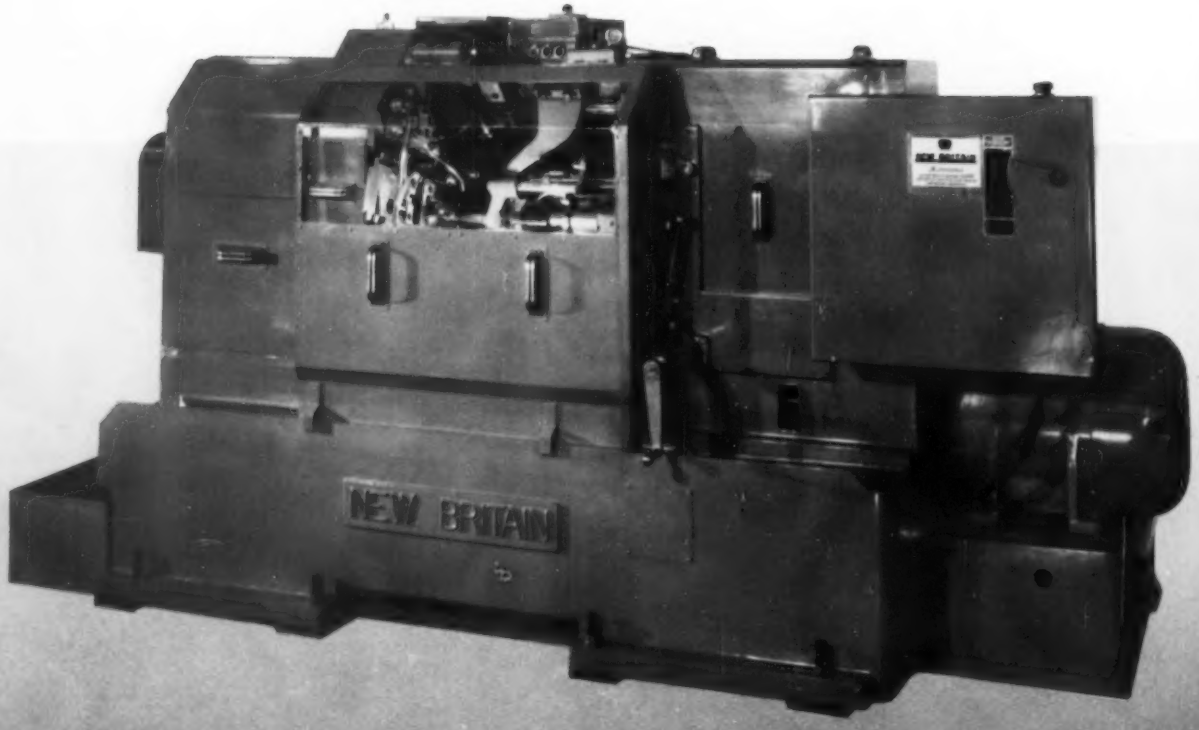
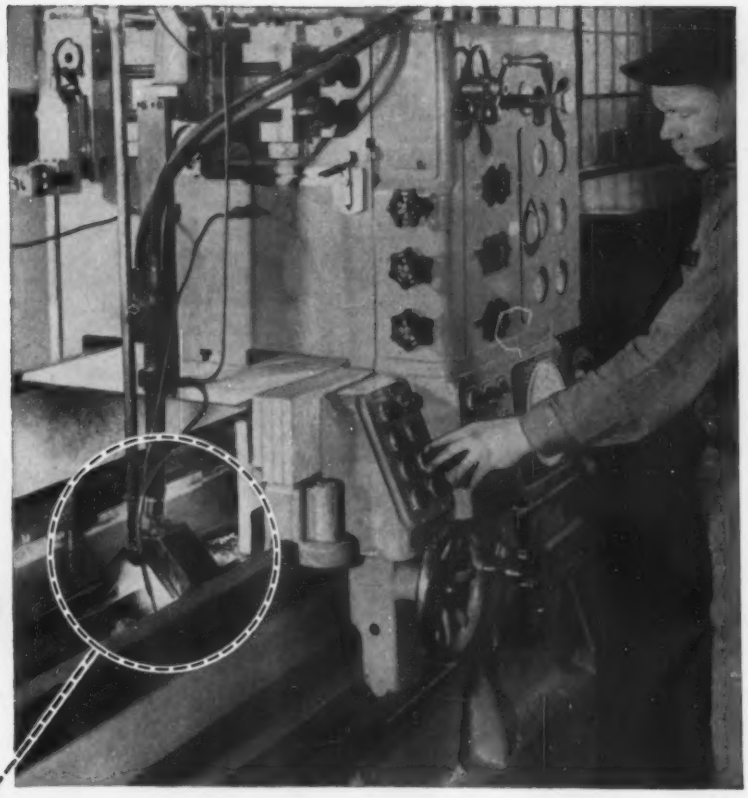
Here is a new New Britain bar machine with the ruggedness, power, speed and versatility to shed new light on your profit picture. Where you have bar work that now requires more than one machine, it may be practical to eliminate costly finishing operations by doing the whole job on a New Britain Model 62. Ask your New Britain representative or write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



HIGH SPEED FLAME-HARDENING



Cross-section view shows uniform depth of hardened surface.

SPECIAL MACHINE UPS LIFE OF GRAPHITIC STEEL PARTS

LINDE engineers have assisted Cincinnati Steel Treating Company in developing a flame hardening machine which increases service life of 16 ft. long, graphitic carbon steel lathe ways . . . Development of this automatic, high speed machine is another example of how LINDE Service Engineers are helping LINDE's customers up production speed and unit quality through co-operative research engineering.

With this new machine, a lathe way to be treated is placed on a magnetic chuck in a water filled channel. Flame-hardening heads and control mechanism move at predetermined speeds along the part. After it cools, the lathe way is placed in a refrigerator for 24 hours which stabilizes the steel, and brings its case hardness to a minimum of 60 Rockwell "C" scale.

The benefits of LINDE's research, engineering, and over 40 years of accumulated know-how stand behind each of its customers to help them solve production problems. Get these "plus-values" which LINDE offers—it pays you to do business with LINDE.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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Division of Union Carbide Canada Limited, Toronto

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Yours to put to work . . . . our mechanical ingenuity and craftsmanship . . . . experienced in producing an infinite variety of metal parts in such fields as automation, communication, medical, electronics, safety devices, product development, etc. The capacity of ASC springmaking minds and machines is unlimited. Ask any Division to examine your sample or blueprint.

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(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER III—Lustrous, Corrosion-Resistant Finishing with Chemical Polishing Iridite®

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are widely accepted throughout industry as an economical means of providing corrosion protection, a good base for paint and decorative finishes for non-ferrous metals. Certain of these coatings also possess chemical polishing abilities that have luster-producing, as well as corrosion-inhibiting, effects on zinc and cadmium plate, zinc die castings and copper alloys. However, continued developments in this field have been so rapid that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this discussion of the many ways in which this chemical polishing characteristic can be used in final finishing or pre-plating treatments to produce a lustrous appearance with distinct display and sales appeal and appreciable savings in cost. Report I on decorative, corrosion-resistant finishes and Report II on paint base corrosion-resistant finishes are available on request.

The degree of luster possible on a surface is a function of the degree to which the surface can be smoothed. Leveling to provide a smooth surface can be achieved by mechanical or chemical means, or a combination of these, depending upon the luster desired and the original condition of the metal. Chemical polishing effectively imparts luster otherwise difficult and costly to obtain. For this reason, it is often used to supplement or entirely replace mechanical polishing, depending upon the application and the original condition of the metal. Chemical polishing has the additional advantage of providing overall treatment of the submerged part. It reaches into even the deepest corners and recesses that are otherwise inaccessible. Certain of the Iridites are specifically designed to perform this chemical polishing operation. Also, they provide corrosion protection as do all Iridites, thus may be used as a final finish or a pre-plating polish.

If Iridite is to be used as a final finish, in contrast to pre-plating treatment, the chromate conversion coating generated is allowed to remain, providing good corrosion resistance. Color inherent in these Iridite films ranges from a yellow cast to yellow iridescent. These coatings may be used without further treatment where this color is acceptable and good corrosion resistance is desired. Further, these basic coatings can be tinted by dyeing. Among the dye tints available are shades of red, yellow, blue and green. If desirable, the basic coatings can also be modified by a bleach dip leaving a clear bright or blue iridescent finish. In all cases bleaching reduces corrosion resistance.

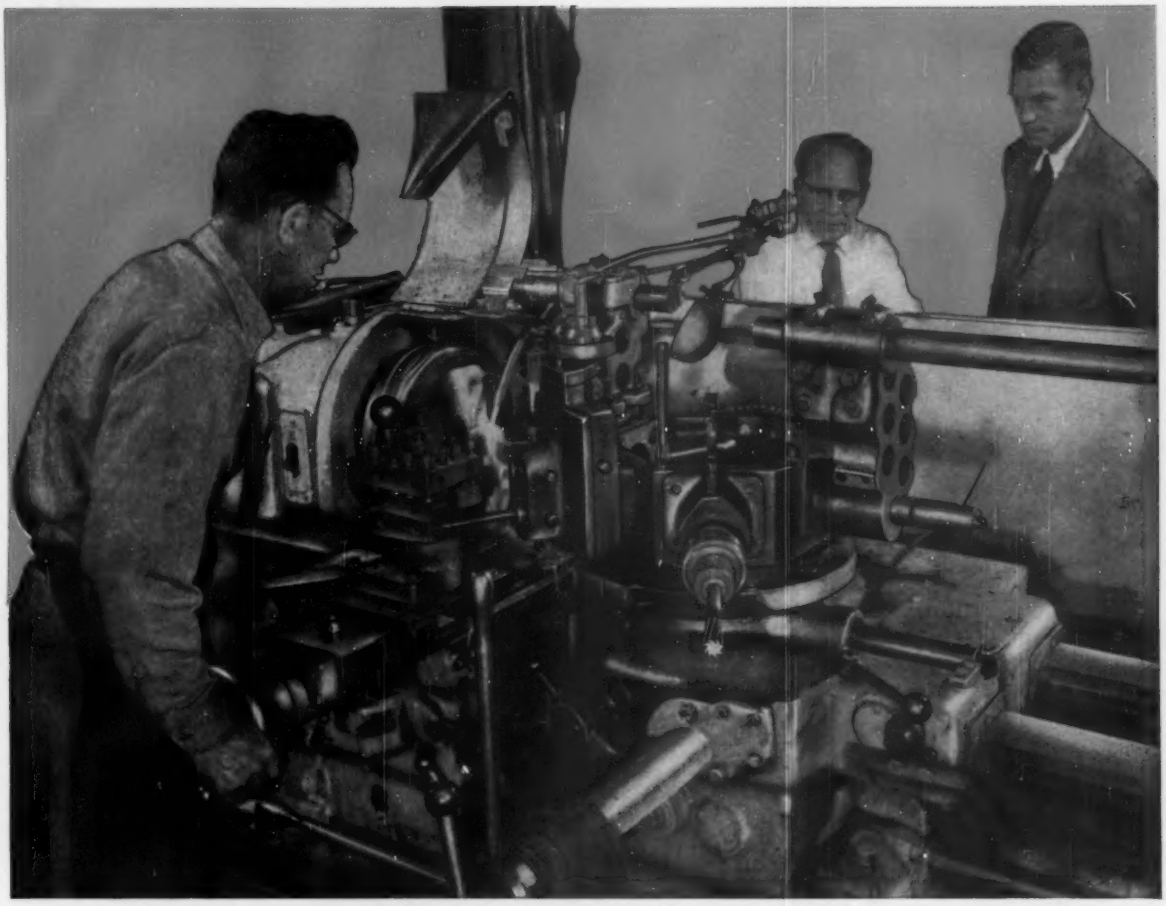
As examples of this type of final finishing, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, lustrous chemical polishing of the as-cast surface of zinc die castings. Thus, in many cases, sizeable savings in finishing cost are realized by elimination of plating costs. This economical method can be used on tools, appliance parts, toy pistols, locks and many other small castings. Another example is the treatment of copper and brass parts, such as welding tips, to eliminate buffing and provide additional corrosion resistance. In many cases, handling costs are reduced appreciably by replacing piece-part handling with bulk processing. Still another example of the use of this chemical polishing and protective quality of Iridite is a simple system of zinc plate, Iridite and clear lacquer instead of more costly electroplated finishes. Typical of this type of lustrous finish are builders hardware and wire goods.

As a pre-plating treatment, in contrast to final finishes, Iridite can be used to chemically polish zinc die castings or copper prior to plating. In such cases, Iridite should be applied as an in-process step, so that the protective film is removed before the plating cycle. The savings in handling, material and labor costs are obvious. This process has made it practical to plate chrome directly over copper on steel, conserving nickel, yet producing a lustrous chrome finish. Used after stripping faulty plate in reprocessing zinc die castings, Iridite restores luster to the casting, thus making possible replating without blistering.

Other Iridite finishes are available to produce maximum corrosion resistance, a wide variety of decorative finishes and excellent bases for paint on all commercial forms of the more commonly used non-ferrous metals. As a final finish, appearance ranges from clear bright to olive drab and brown and many films can be bleached or dyed. As a paint base Iridite provides excellent initial and retentive paint adhesion and a self-healing property which protects bare metal if exposed by scratching. Iridites have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of their top performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product demands the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.



Shop Superintendent Bonnafe and Gulf Sales Engineer G. R. Burnham check on performance of Gulfcut 51A as turret lathe turns a stainless steel drive roll for a wire belt.

"Gulfcut gives us longer tool life,"

says Joseph Bonnafe, Shop Superintendent, J. W. Greer Company, Wilmington, Mass.

Shop superintendents like Mr. Bonnafe, engineers and machine tool operators *know* that production can be improved and costs lowered through the use of cutting oils designed specifically for the job. And, they know they can get the right oil for *every* job from the complete line of Gulfcut Oils. Reports like these come from the field every day:

From an aluminum plant: ". . . stepped up production of aluminum caps 25%, increased tool life well over 100%, and we're getting better threads."

From a plant working tough titanium-alloy stainless steels: ". . . results were phenomenal. Tool life increased over 40% and surface finish was improved 43 microns."

Your Gulf Sales Engineer can pin-point your cutting oil requirements—can help you improve shop efficiency through the use of the most suitable cutting oils for your needs. Contact him today at your nearest Gulf Office.

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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

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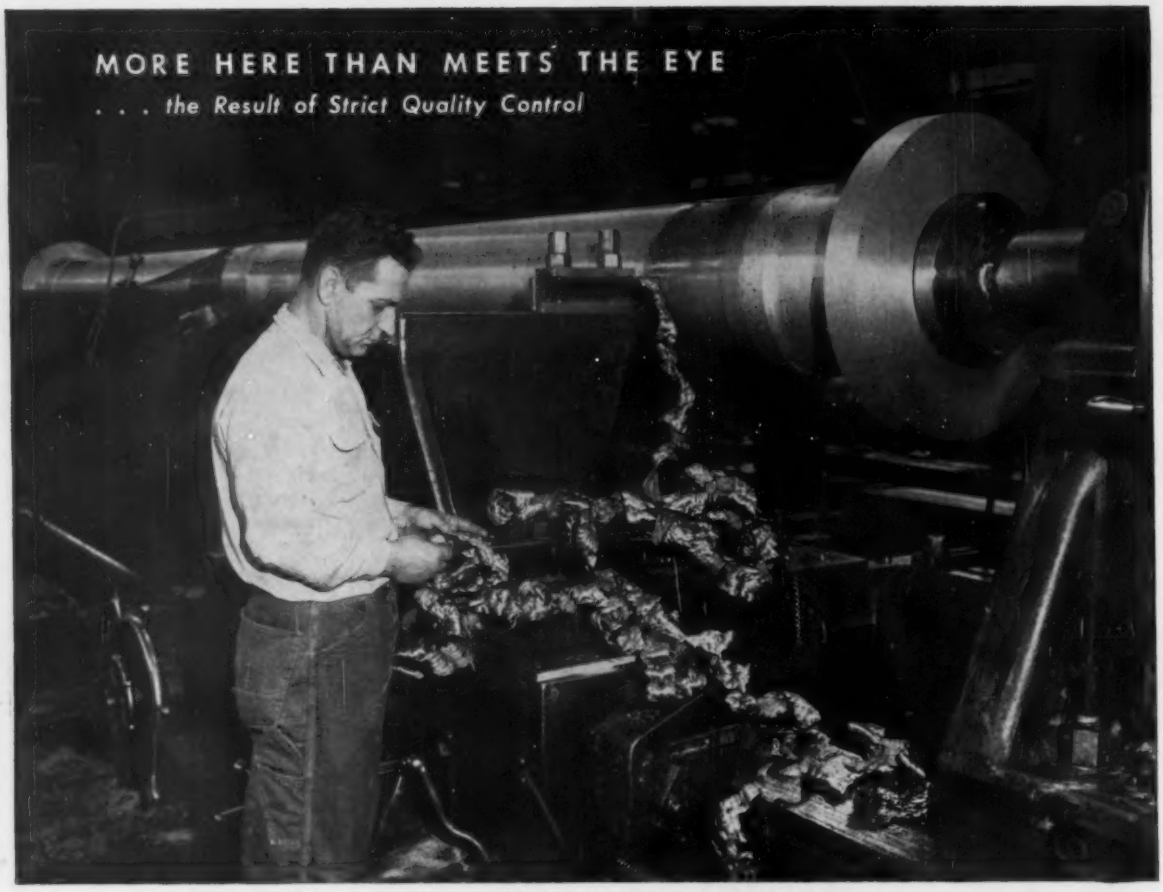

**37 Feet of Unbroken Steel Chip Thin as a Cigarette Paper*

A 37 foot unbroken chip as thin as a cigarette paper, coming off the tool, dramatizes the quality of the steel in this large ship's shaft.

Behind this proof of quality steel is the ever expanding program at Erie Forge & Steel Corporation to develop improved techniques in steel-making . . . strict quality control at every step of the way from the composition of the steel to the finished product. Control of phosphorus and sulphur, maximum elimination of hydrogen, improved concepts in testing and evaluating quality are but a few of the areas under continuous research and development.

At Erie Forge & Steel, the belief that "excellent is not good enough" is sound assurance that you can place your steel forging and casting requirements here with full confidence. Your advantage is obvious . . . your steel forgings and castings are followed from start to finish under "One Responsibility and One Control".

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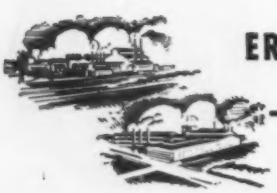

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

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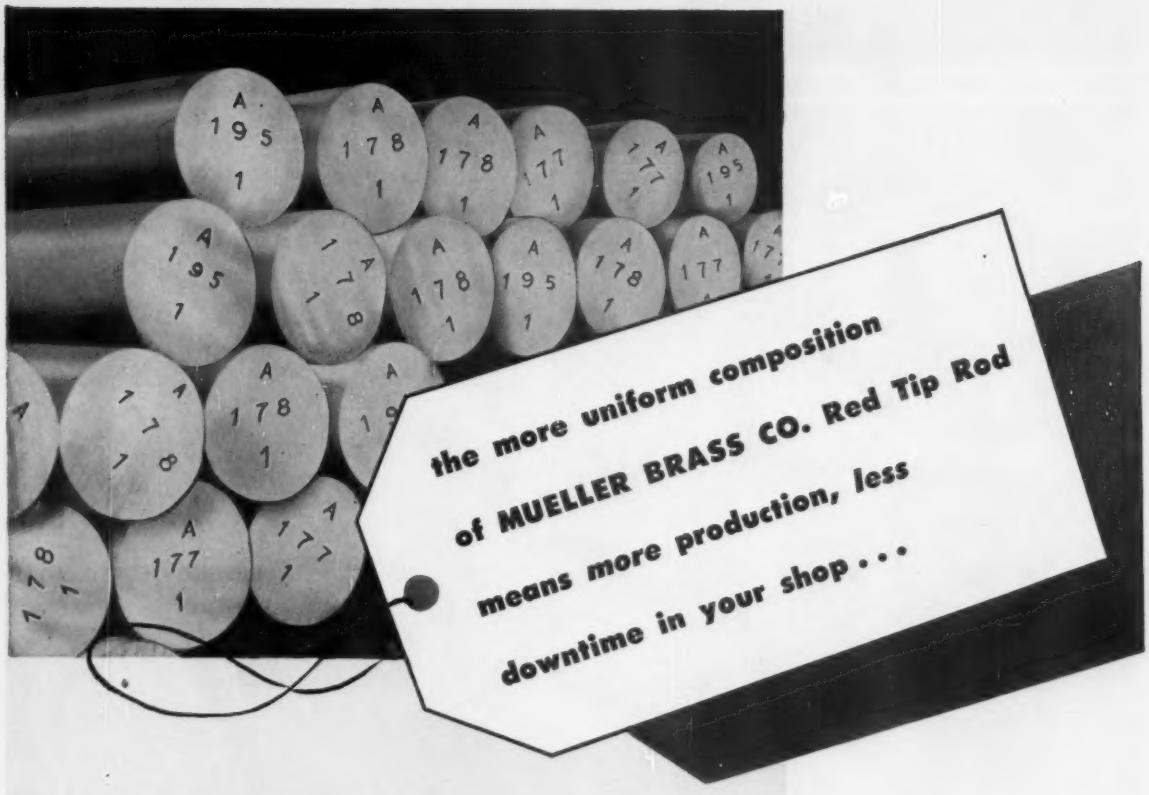
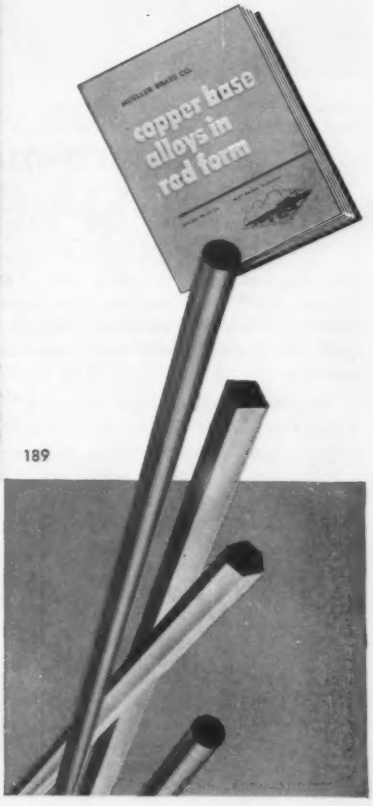


The new semi-continuous process for casting copper alloy billets at Mueller Brass Co. means that the Red Tip Rod you buy is more uniform than ever before. Production tests have proven that rod made under this new automated process has many advantages for you . . . advantages such as faster machining, increased tool life, less downtime and a finer finished product.

The larger volume of metal being cast as a unit in our new process gives us better control of composition. Laboratory technicians keep a continual check on the melt analysis by means of a direct reading spectrometer which takes only 90 seconds to analyze the alloy. Metal is improved through a new cooling process that results in a greater internal soundness. These and many other advanced techniques result in billets (and therefore rod) which are always the same from one lot to another. All billets are stamped and systematically recorded so that each customer rod order can be extruded from billets of uniform composition.

For the next production run on your automatic screw machines, order Red Tip Brass Rod, and see how our new automated process results in more profitable production for you. Write today for Engineering Manual FM-3010, "Copper Base Alloys in Rod Form", for more detailed information.



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MUELLER BRASS CO.
PORT HURON 24, MICHIGAN

X.F. Swiss Pattern 65-Gauge 3" Broach file—one of the smallest Nicholson-made files

18" Mill Bastard—one of the largest files made by Nicholson

From micro-mechanics to forgings . . . there's a Nicholson or Black Diamond file for every purpose

You may not finish miniature dies or components by hand in your plant. And you may not dress huge forgings. But there's a Nicholson or Black Diamond file that's exactly right for each of these uses—and for every file use in between.

Depending on the job at hand, you can select X.F. (EXtra Fine) Swiss Pattern files in hundreds of shapes and sizes . . . Special Purpose files for aluminum, brass, lead, stainless steel, and other metals and plastics . . . Machinists' files, Regular Purpose files and rasps . . . from more than *six thousand* consistently high-quality Nicholson and Black Diamond varieties.

Your Nicholson or Black Diamond catalog will show you the wide choice of files and rasps available. And you can learn a lot about file selection, care and use from "File Filosophy," an interesting, profusely illustrated book that's yours for the asking.

If you happen to have an unusual filing problem, your industrial distributor is likely to have the solution. He's an expert with a specialized knowledge of industrial equipment and processes. So call on him for professional advice as well as service.

Always specify Nicholson or Black Diamond brand

NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)

NICHOLSON FILE COMPANY

A FILE FOR EVERY PURPOSE

WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!

DIESEL ENGINE FRAME: Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

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SINK DIES FASTER in FINKL Die Blocks with

Machining time, such as planing, rough cutting, milling, hand benching and burring are appreciably reduced on Finkl SMQ Die Blocks. Thorough field testing shows that the Special Machining characteristic of SMQ saves shop time and gets the die into production sooner.

There is a Finkl steel available for any forging need. All are quality controlled through each step from our own melt shop to final inspection.

When you next consider die blocks, your local Finkl representative will gladly help you plan for "impressions that last."

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HOT WORK STEELS
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FORGINGS
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ELECTRIC FURNACE STEELS

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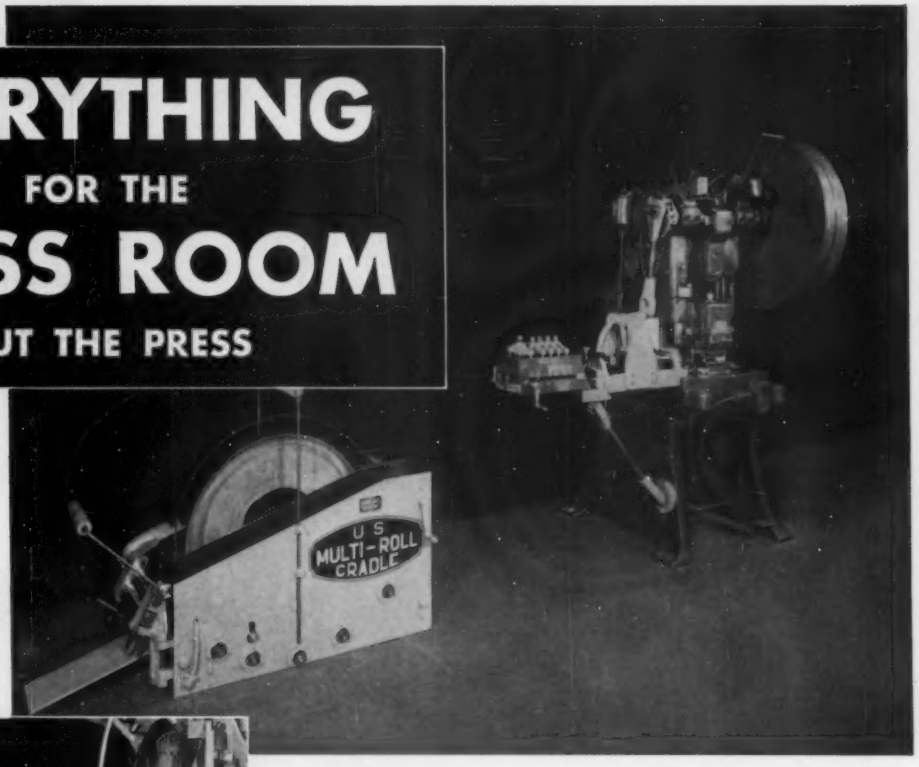
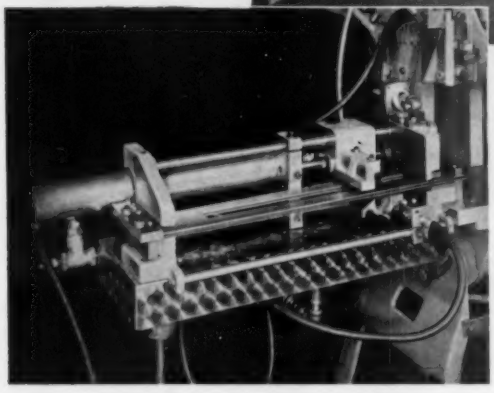
PRESS ROOM
BUT THE PRESS



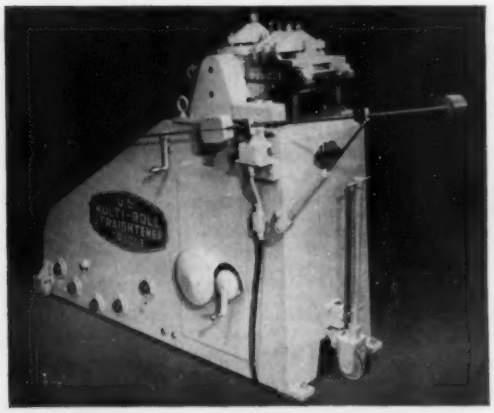
Right: Conventional OBI Punch Press equipped with U.S. Slide Feed with Plain Straightener and U.S. Multi-Roll Cradle.



Above: U.S. Air Operated Slide Feed (no mechanical connections to the press), open side type, suitable for material up to 15" in width and feeding length adjustable up to a maximum of 12" at one stroke. Longer feed lengths obtainable by cycle feeding with counter.

Reduction of costs is a primary concern of all manufacturers. Units included in the line of U.S. Automatic Press Room Equipment such as U.S. Slide Feeds, Roll Feeds, Stock Reels, Coil Cradles, Stock Oilers and Wipers, Scrap Choppers, are designed and built with the aim of converting the punch press into an automatic machine. The end results are increased production, reduced scrap, reduced operator fatigue, reduced material handling and overall reduced costs.

If you use presses in your production program, write for our Bulletins 80-C and 95-C illustrating and describing U. S. Automatic Press Room Equipment.

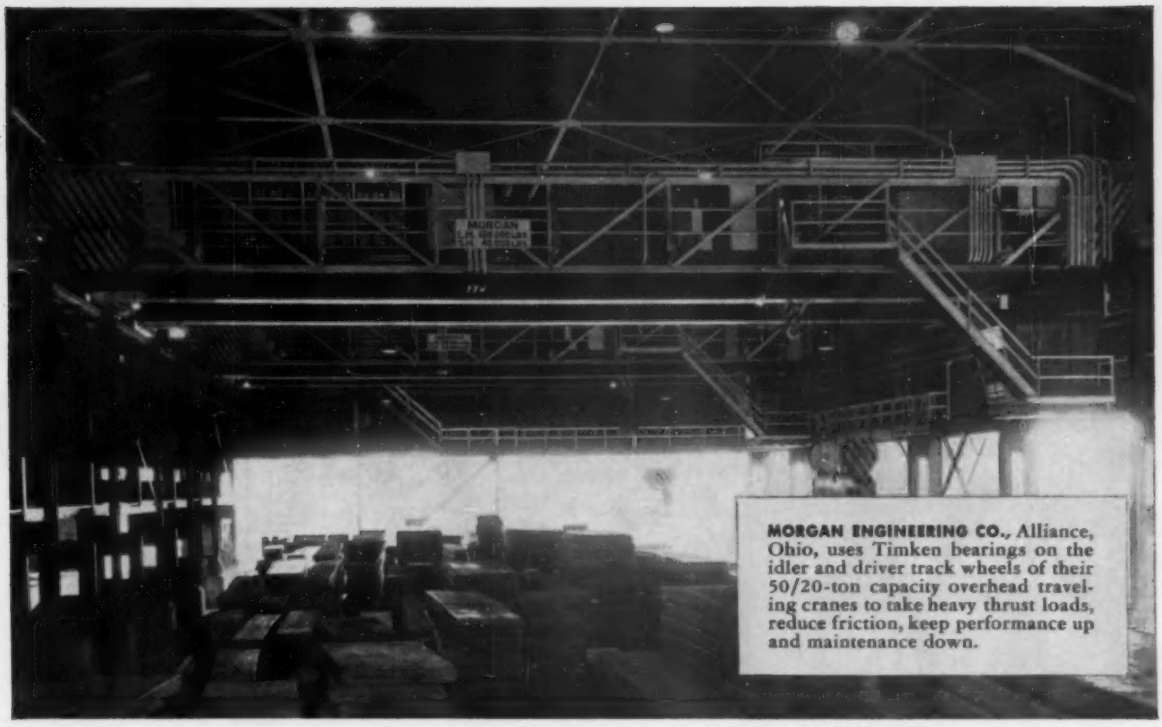


Left: Model PDSC-940 U.S. Combination Coil Cradle and Power Driven Straightener suitable for material up to 9" in width and coils with O.D. up to 40", weight capacity 1,500 lbs.

U. S. TOOL COMPANY, Inc.

AMPERE (East Orange) NEW JERSEY

Builders of U. S. Multi-Slides — U. S. Multi-Millers — U. S. Automatic Press Room Equipment—U. S. Die Sets and Accessories



MORGAN ENGINEERING CO., Alliance, Ohio, uses Timken bearings on the idler and driver track wheels of their 50/20-ton capacity overhead traveling cranes to take heavy thrust loads, reduce friction, keep performance up and maintenance down.

Morgan Cranes move hot slabs fast

...TIMKEN® bearings cut traveling costs

THESE Morgan heavy-duty cranes move hot steel slabs from cars to storage in an Eastern steel mill and do it fast. To be sure they keep rolling and at minimum cost, Morgan engineers mounted the idler and driver track wheels on Timken® tapered roller bearings. They keep them on the go with minimum maintenance.

The tapered construction of Timken bearings lets them take *both* radial and thrust loads in any combination. And full line contact between the rollers and races gives Timken bearings *extra* load-carrying capacity. They can take the heavy thrust loads of crane operation in stride. No additional thrust devices are needed. Longer bearing life is assured. Cranes keep rolling.

Timken bearings practically eliminate friction because they are designed by geometrical law to have true rolling motion and are made microscopically accurate to conform to their design. Because friction is reduced wheels and loads roll smoothly. Costly maintenance drops, power is saved.

And by holding housings and shafts concentric, Timken bearings make closures more effective. Dirt and dust stay out; lubricant stays in. Lubricant and upkeep costs are also decreased.

What's more, Timken bearings shrug off shock loads. They're case-carburized to give them hard, wear-resistant surfaces over tough, shock-resistant cores.

Only Timken bearings give you so many advantages. Always specify Timken bearings for the machines you buy or build. Be sure the trademark "Timken" is on every bearing—it's your assurance of full, money-saving value. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

REVOLUTIONARY BUCYRUS PLANT HELPS HOLD DOWN RISING COSTS

At a new plant in Bucyrus, Ohio, the Timken Company has substantially reduced the cost of tapered roller bearings by: 1) producing these bearings under a new system of extreme mechanization; 2) standardizing on 13 bearing sizes with the widest applications throughout industry. Manufacturers can take advantage of these lower costs by redesigning applications to use these Bucyrus sizes. And as more switch to Bucyrus bearings, production costs can drop still further, meaning even lower costs to you.

TIMKEN

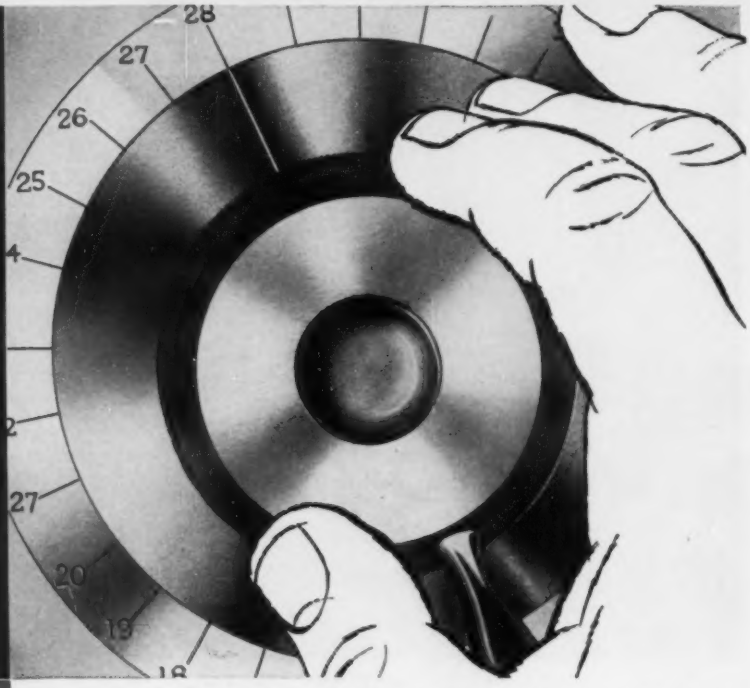
TRADE-MARK REG. U. S. PAT. OFF.

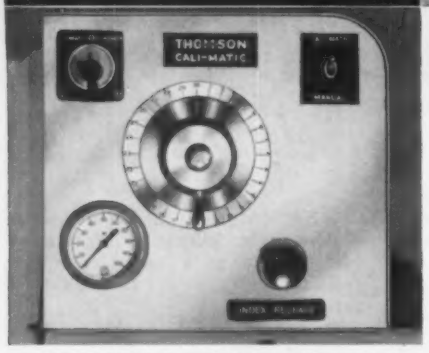
TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

ANOTHER THOMSON CONTRIBUTION TO BETTER, FASTER RESISTANCE WELDING

THOMSON "Cali-Matic" spot and projection WELDER CONTROL





The "Cali-Matic" control is used with an electronic timer and phase shift heat control.

ONE DIAL SETS ALL VARIABLES

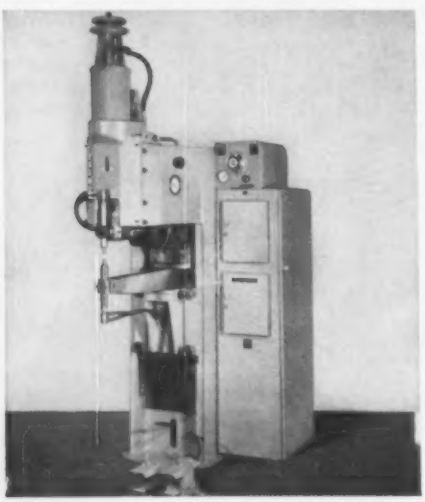
Turn one dial . . . and "Cali-Matic" will instantly set up any air operated spot or projection welder for any combination of materials and thicknesses. Force, weld time, heat, hold time — as many as five or six variables — all are adjusted simultaneously by a single setting knob.

This completely new concept in resistance welder control provides simple, errorproof machine set-up for spot welding, projection welding, mash welding, jump welding, stud welding, cross wire welding and similar operations. It can also be adapted for seam welding and for three-phase as well as conventional single-phase power.

"Cali-Matic" becomes your *welder expert*, eliminating the need for a special set-up man. The unit has a range of settings which easily provides for more than 100 combinations of materials and thicknesses or a similar number of drawing or parts numbers. Anyone capable of operating the welder can make the simple, single adjustment needed for any job set-up.

Accuracy of settings is assured by using one positive position dial instead of many non-positive dials.

Write for complete information and new complete catalog of Thomson Welders



THOMSON Model A Press Welder equipped with "Cali-Matic" for one dial set-up.

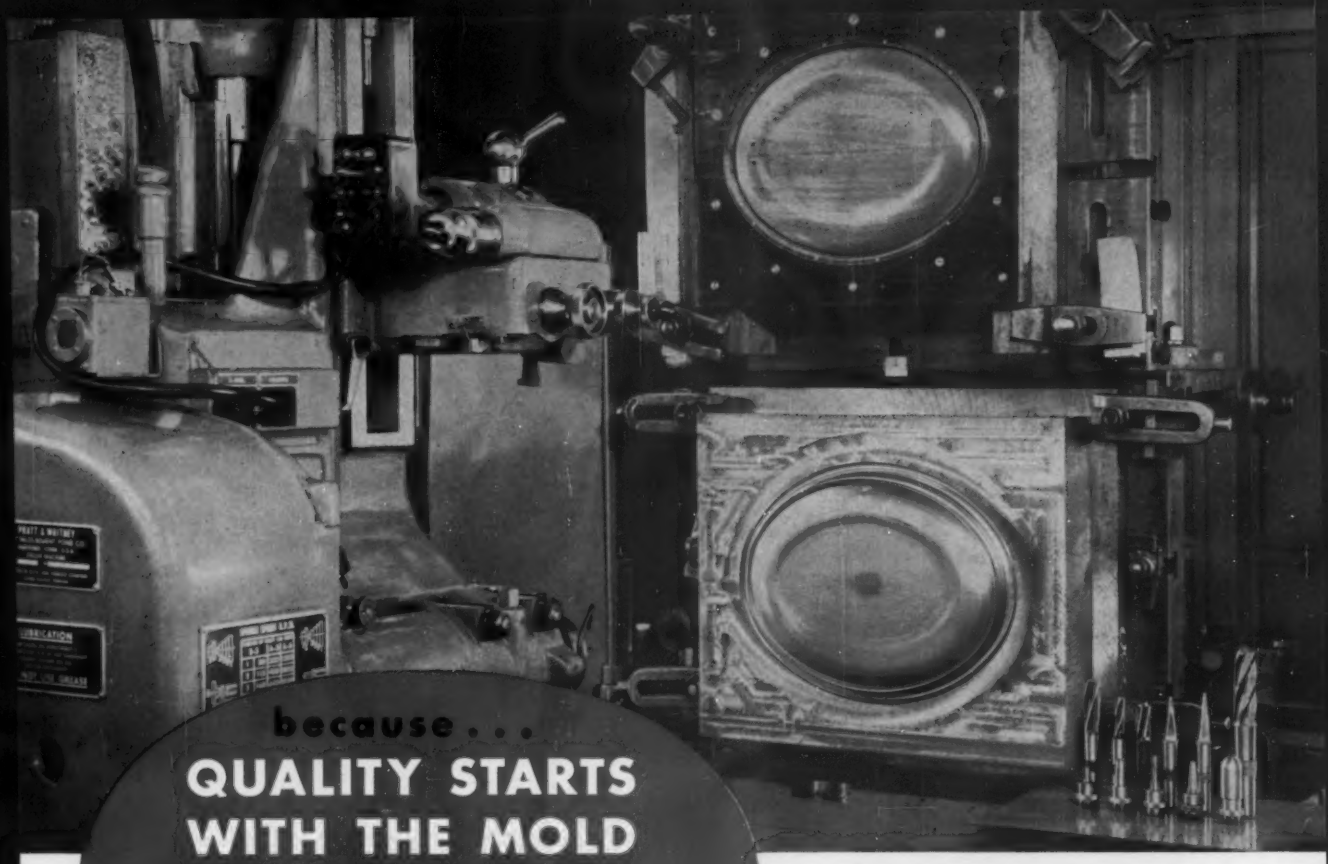
FOUNDED IN 1886 BY ELIHU THOMSON

INVENTOR OF RESISTANCE WELDING

THOMSON *Welders*

THOMSON ELECTRIC WELDER COMPANY
360 PLEASANT STREET, LYNN, MASSACHUSETTS

THOMSON makes a complete line of standard spot, projection, seam and flash-butt welders; also, aircraft, brake shoe, fabric and custom-engineered resistance welders.



because . . .

QUALITY STARTS WITH THE MOLD

. . . better start with

PRATT & WHITNEY "KELLERING"

PRODUCE ALL YOUR MOLDS . . .
simple or intricate, small or large, original or duplicate, single or multiple cavity.

FASTER, BETTER AT LOWER COST

ON A P&W KELLER MACHINE . . .
rugged, dependable, relatively simple. Built specifically for automatic, tracer-controlled milling. Takes on your toughest jobs without requiring major alteration. Duplicates any 3-dimensional shape quickly, accurately, automatically.

The complete line of P&W Keller Machines includes models for a very wide range of work sizes . . . there's a machine just right to handle ***your*** molds better. Write now on your Company letterhead for complete information. Ask for your free copy of Circular No. 490-3 describing the Type BL (for small and medium size molds), or Circular No. 565-1 describing the Type BG-21 (for larger molds).

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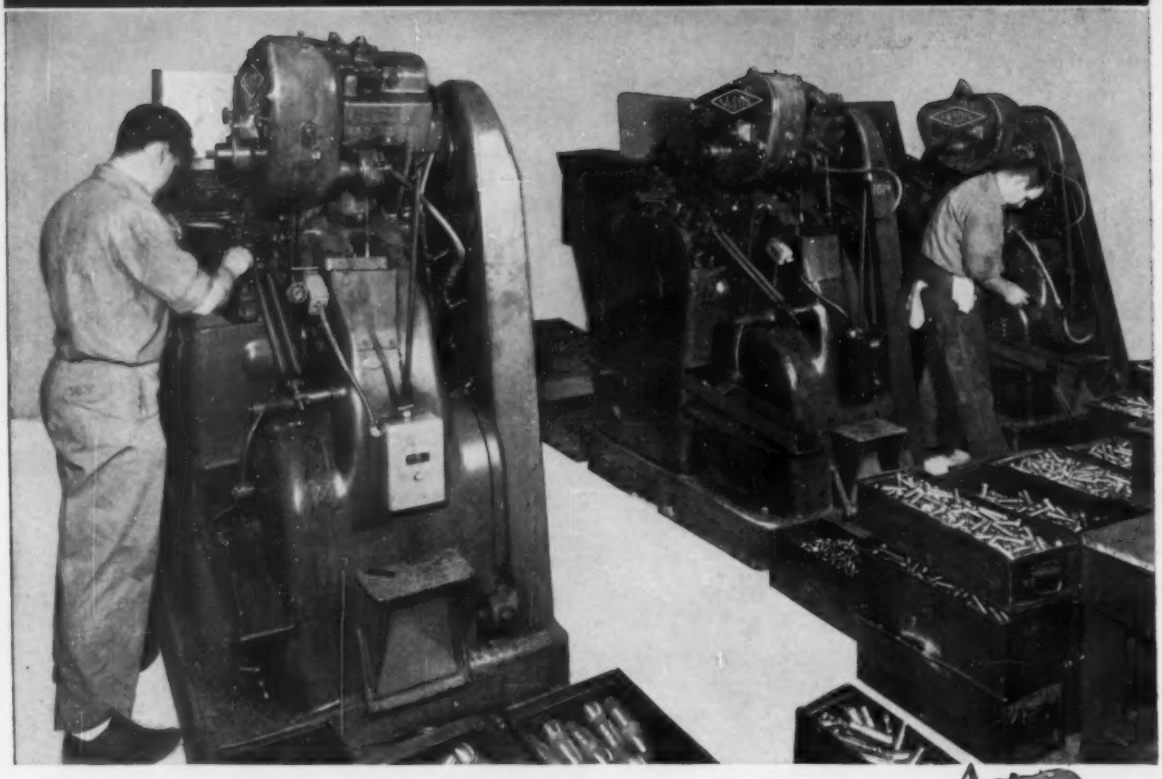
FIRST CHOICE FOR ACCURACY SINCE 1860

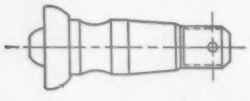
MACHINE TOOLS • CUTTING TOOLS • GAGES

LANDIS "Automatic" PROVED BY PRODUCTION . . . .



Points and Threads 1020 Ball Studs per hour

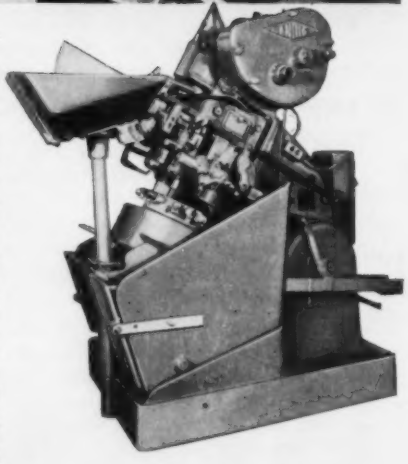
Through the use of LANDIS Automatic Forming and Threading Machines, a large manufacturer has solved his problem of mass-producing certain automotive parts.



The workpieces are cold-forged blanks, from which ball studs are made. Specifications require a 45° point and a 9/16" 18-pitch N.F. thread cut to a length of 5/8". In constant daily operation is a battery of LANDIS Automatic Forming and Threading Machines, each of which point and thread 1020 pieces per hour. Four hours of production are obtained between each chaser grinding, resulting in low tool cost and minimum machine down time.

Because of their universal features, LANDIS Automatic Forming and Threading Machines are adaptable to mass-production operations on a wide range of automotive parts. By means of pick-off speed change gears, the machine cycle can be varied to accommodate any combination of thread length, pitch, and thread diameter, within the capacity of the machine—therefore this machine is adaptable to a wide variety of work. Hopper feed and automatic operation throughout enable one operator to keep a battery of machines in constant production, while set-up changes of all types can be made in minimum time.

Can you revolutionize your pointing and threading operations with LANDIS Automatic Forming and Threading Machines? Please give specifications when writing for complete information.



LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

PENDANT-TYPE BOOM SUSPENSION with 8 parts of operating line between bridle and "A" frame is ideal for changing boom lengths conveniently. *Safety Boom Stops* of telescoping pipe type are furnished on machines equipped for lifting-crane service.

OPEN THROAT BOOM carries two boom point sheaves for reeving up to four parts of line. Special boom point equipment for 5- or 6-part rigging is available. Standard booms are 30 feet (15-B) and 35 feet (22-B). They may be lengthened by 5-ft., 10-ft., or 20-ft. inserts.

EXTENDIBLE OUTRIGGERS — I-beam, manually-controlled outriggers, two on each side of carrier chassis, provide added stability for swinging capacity loads. Jackscrew-type outriggers are available at extra cost.

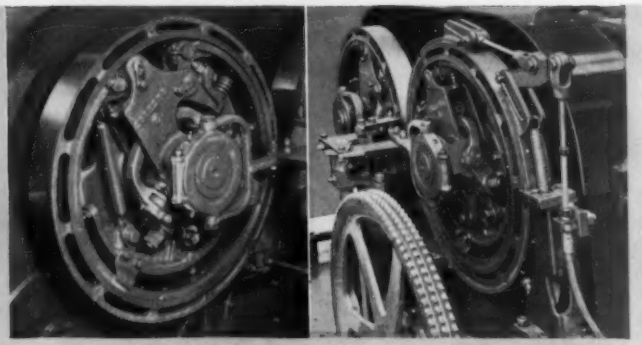
How BUCYRUS ERIE Transit Cranes Cut Handling Costs

Bucyrus-Erie Transit Cranes, combining heavy-duty lifting capacity with rubber-tired mobility, are ideally suited to a variety of handling jobs. They cut your handling costs from the start because so many features that are "extras" at additional cost on other cranes are furnished as standard equipment on Bucyrus-Erie machines. Check the advantages pictured here — see what they can mean to your men in the yard.

In addition, Transit Cranes have *power controlled lowering* for the main hoist line on lifting cranes to permit delicate positioning of loads, and *power controlled boom hoist*, fully independent of all other functions, to provide high-accuracy boom control in crane work.

For more information on these and other Transit Crane features, see your nearby Bucyrus-Erie distributor soon for complete details — two models available — the 15-ton 15-B, and the 25-ton 22-B.

254E56C



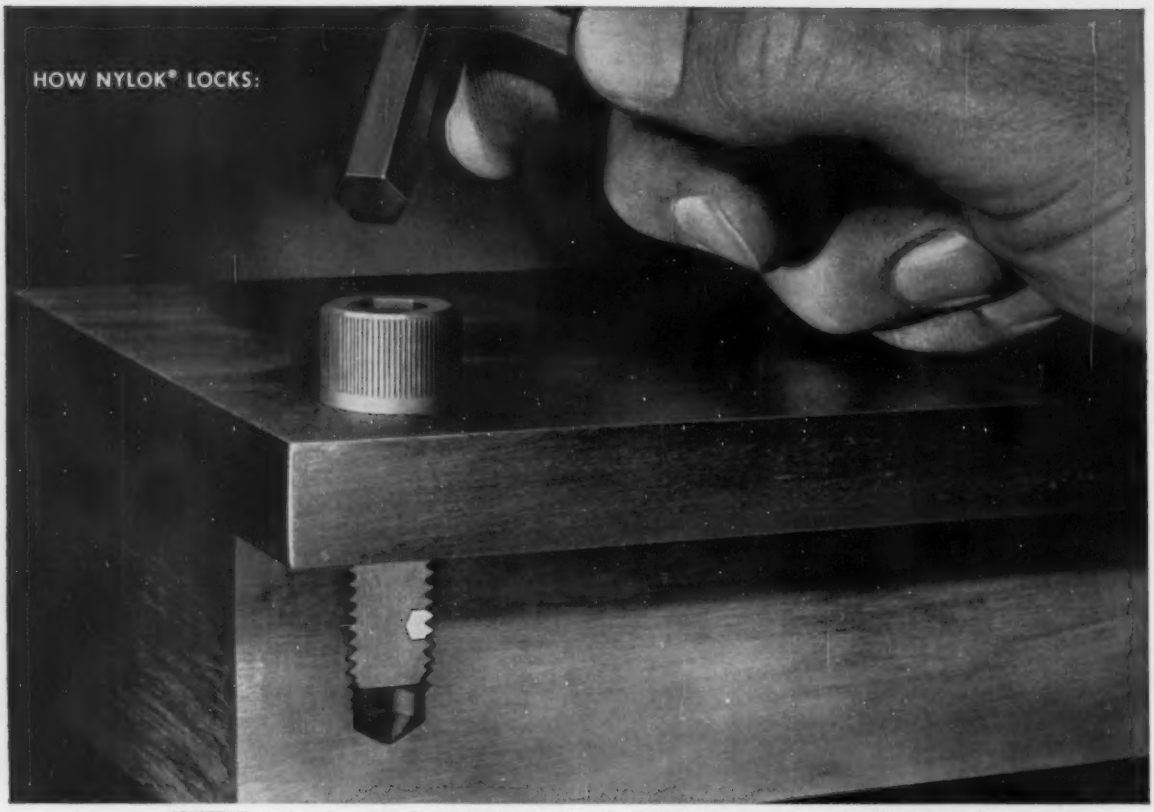
FOUR MAIN OPERATING CLUTCHES are alike, with normal replacement parts interchangeable. Friction bands are reversible end for end. A floating link at the dead end of each clutch band (except one special clutch used for power controlled load lowering) materially increases the effective contact area between the clutch band and housing, reducing hand lever loads and increasing the load capacity of the clutch.

FRICTION SWING BRAKE, in addition to regular swing lock, enables operator to spot and hold the boom point over a desired position. Ratchet squeeze lock holds brake "on" without operating holding lever.

For More Information Circle 171 on Reader Service Card

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin



LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together, and locks the screw securely.

NEW—a complete line of self-locking UNBRAKO socket screw products that won't work loose

They simplify design and save production time

UNBRAKO socket screws are now available embodying the Nylok* self-locking principle. Nylok provides a truly practical new solution to the problem of making screws self-locking.

You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

Self-Locking UNBRAKOS are completely reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, on properly seated screws, the pellet acts as a liquid seal.

Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

T.M. Reg. U.S. Pat. Off., The Nylok Corporation

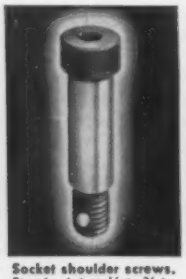
UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

Socket head cap screws. Standard sizes #6 to 1 in.



Socket shoulder screws. Standard sizes ¼ to ¾ in.

Flat head socket screws. Standard sizes #6 to ¾ in.

Button head socket screws. #6 to ⅜ in.

Socket pressure plugs. Standard sizes ⅛ to 1¼ in.

Socket set screws. All standard point types. #6 to 1 in.

How
BRAINARD STRAPPING SERVICE
reduced packaging costs by 90%

TRANSFORMER hangers formerly crated for handling and shipment are now strapped into compact, easily handled units at a savings of up to 90% in costs of labor and materials. The savings followed a cooperative effort by Thiel Tool and Engineering Company, St. Louis, and a Brainard Strapping Expert. They're typical of steel strapping techniques being adopted by hundreds of companies to lower costs, increase efficiency and reduce shipping losses. Let a Brainard Strapping Expert point the way to similar savings for your company. You'll find him listed in your telephone directory. Or write direct to Brainard Steel.

JACK N. GONZ, the Brainard Strapping Expert in St. Louis, helped Thiel Tool devise this money-saving application for steel strapping.

Brainard
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

THE BRAINARD STEEL DIVISION
of the Sharon Steel Corporation
Dept. I-12, Griswold Street, Warren, Ohio
MAKERS OF QUALITY STEEL STRAPPING

MCA Columbium *and* research

A challenge for the metal industry

Research in metals is today the most extensive and rewarding in history. The challenge of this fast moving jet age and the unfolding of atomic power has presented demands far surpassing previous metallurgical requirements.

In contrast with the diminishing supply of some alloying elements, previously-scarce Columbium is now, and will be in the fore-seeable future available in great abundance. Here is an element that has scarcely been investigated, yet its physical properties offer great metallurgical advantages. It already is used in high-temperature and anti-corrosion applications. It also shows promise in the heat-treated common steels for added impact and transverse strengths. Tool steels used for long production runs may be aided by Columbium.

The unlocking of further knowledge in the use of Columbium is an opportunity which will prove most rewarding to alert metallurgists. For further details and technical application data write today.

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Grant Building CORPORATION OF AMERICA Pittsburgh 19, Pa.

Offices: Pittsburgh, Chicago, Los Angeles, New York, San Francisco
Sales Representatives: Brumley-Donaldson Co., Los Angeles, San Francisco
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MCA

Another Modern Plant by **AMERICAN BRIDGE**

METAL STAMPING PLANT

FISHER BODY DIVISION

GENERAL MOTORS CORPORATION

NEAR MARION, INDIANA

One of the largest industrial projects undertaken in this country in recent months is nearing completion on schedule. It is the vast new metal fabricating plant for the Fisher Body Division of General Motors, located near Marion, Indiana.

All of the 32,050 tons of structural steel that went into this big project was fabricated and erected by the American Bridge Division of United States Steel. The various integrated buildings and related structures comprising the modern plant include:

PRESS SHOP—about 440′ x 1128′—consisting of one transept crane aisle, 120′ x 1128′, and fourteen Press Pit Crane Bays, 80′ x 440′.

METAL SHOP—about 563′ x 1128′—plus Shipping Dock and Future Craneways, 123′ x 964′.

PRESS PIT GIRDERS—for an area about 260′ x 960′ (249,600 sq. ft.) and **PRESS PIT FLOOR FRAMING** for the same area.

BALER HOUSE—78′ x 120′ x 58′1¾″ high.

BOILER HOUSE and PIPE TRESTLE.

YARD CRANE RUNWAY—60′ span x 166′ long x 29′ high, supported on A-frame bents.

INDUSTRIAL WASTE TREATMENT PLANT BUILDING—32′3″ x 36′6″ x 19′8″ high, with mezzanine floor 10′ x 19′.

All field connections were made with either high tensile or ordinary bolts.

If you would like to know more about the advantages of having American Bridge handle the structural steelwork for your expanding industrial facilities, just contact the nearest office. Or an inquiry direct to our Pittsburgh headquarters will bring full information.

GM GENERAL MOTORS

General Contractor for Project:

Huber, Hunt & Nichols, Inc.
Indianapolis
and
Ragnar Benson, Inc., Chicago
(a joint venture)

• • •

Designs By:

Argonaut Realty Division
General Motors Corporation

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION • GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

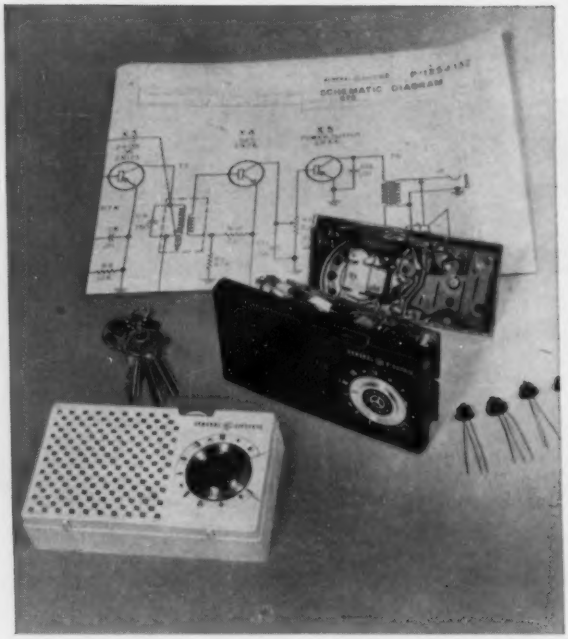
AMERICAN BRIDGE

USS

UNITED STATES STEEL

G. E. plates circuits with "Plus-4" Anodes

G-E "Thru-Con" Printed Circuit Boards offer positive connection through the holes without staking pins. Patterns on both sides if needed. Printed circuitry cuts assembly time; cuts product bulk, weight; reduces inspection time.



This transistorized portable radio features a full printed circuit using a General Electric "Thru-Con" Board. Combining other advances in electronics with the printed circuit makes possible sweeping changes in size, weight, and styling.

A new 75-foot automatic acid-copper electroplating tank is the key to the highly mechanized production system in which General Electric will produce some 6,000,000 of its "Thru-Con"—additive-type printed-circuit boards for everything from transistorized portable radios to street light controls.

Plastic strips, with wiring patterns printed in a microscopic layer of silver, as a conductive coating for acid-copper plating, run through the tank several thousand at one time, in racks suspended from a conveyor.

The tank holds 850 3½" x 1½" x 42" long oval anodes in three parallel rows. It is filled with a standard 30/7 copper sulfate solution. Current input is 25,000 amps—15,000 amps in series through the outside rows and 10,000 amps through the center row.

General Electric tested several different kinds of anodes—is now using Anaconda "Plus-4" (Phosphorized Copper) Anodes. These are the comments on their performance:

1. No sludging.
2. Minimum copper build-up in solution. Better than with any other anode tried.
3. Smooth, heavy deposit.
4. There is a greater cathode deposit. Scrap losses are considerably under those anticipated.
5. Throwing power is excellent, producing uniform plating, even inside holes in the plastic strips, for positive electrical connections.

See for yourself how Anaconda "Plus-4" Anodes can simplify acid-copper electroplating, reduce your costs. Write for information on how you can get a test quantity to supply one tank. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 58142A

"Plus-4" Anodes

(Phosphorized Copper)

A product of **ANACONDA®**

Made by The American Brass Company

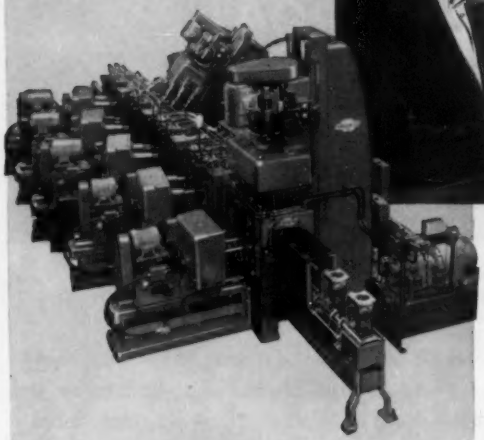
For use under U. S. Patent No. 2,689,216

GREENLEE OFFERS

A PROFIT-MAKING INVESTMENT IN HIGH-PRODUCTION MACHINE TOOLS

Greenlee Six-Spindle Automatic Bar Machine.

Greenlee 22-Station Automatic Transfer Machine for machining transmission cases.



Greenlee 10-Station Automatic Transfer Machine.

Greenlee creative thinking, Greenlee engineering and Greenlee experience combined with that of your own engineers will help you "produce more at lower cost."

Ideas, engineering, experience and facilities of Greenlee Bros. & Co. develop improved methods and machines for greater and greater productivity of future models.

Greenlee's adequate facilities expedite the transition from production ideas to production machines . . . a profit-making investment at work in your plant.

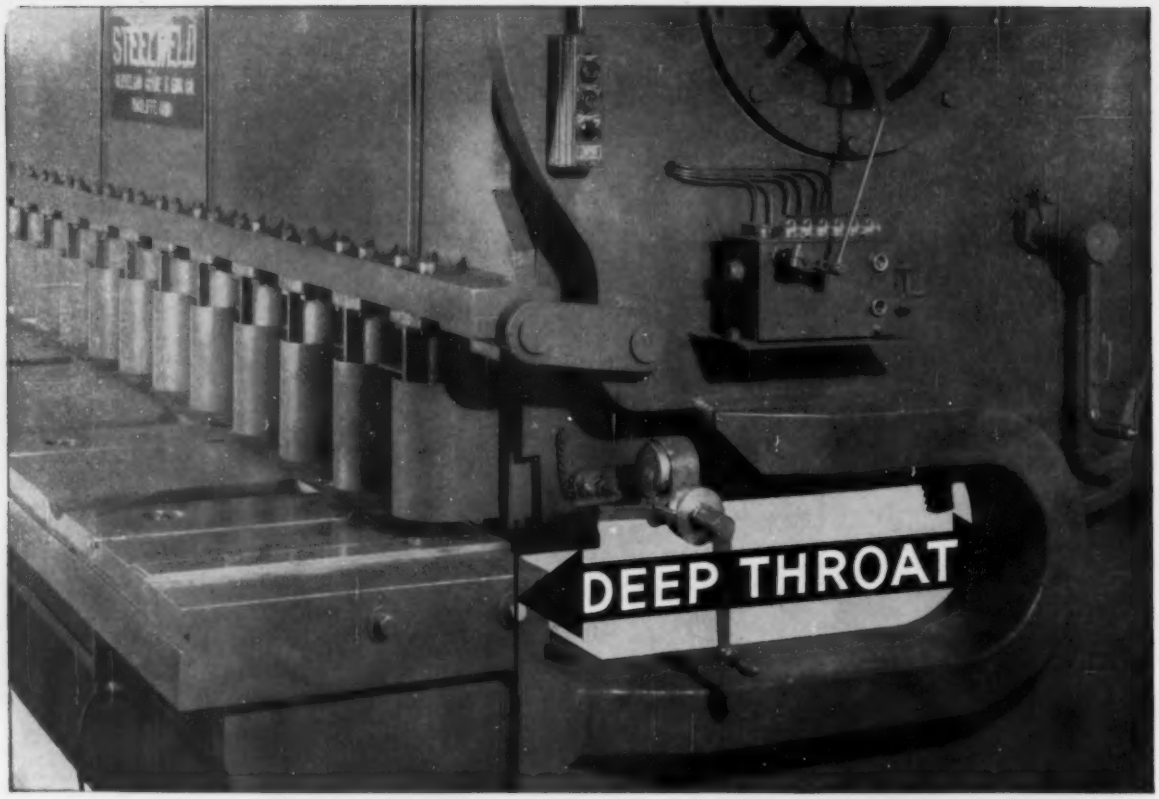
GREENLEE STANDARD AND SPECIAL MACHINE TOOLS

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Six and Four-Spindle Automatic Bar Machines
- Hydro-Borer Precision Boring Machines

Write for Further Information

GREENLEE
PRODUCTION MACHINERY

GREENLEE BROS. & CO.
1812 Mason Ave.
Rockford, Illinois



WIDE SHEETS EASILY SLIT

Steelweld Shears are built for cutting steel plate in thicknesses of ¼ to 1½ inches and in lengths of 6 to 26 feet.

Throat depths of 24 and 36 inches make it easy to slit wide sheets on Steelweld Pivoted-Blade Shears. Twenty-four inches is the standard throat depth for all machines. Thirty-six inch throats can be provided as a special feature for many of the larger size machines.

With such deep throats it is possible to slit plates of 48" to 72" wide down the middle for any length.

It is a simple matter to adjust the blade for slitting. The easily-reached slitting adjustment shaft is turned by a spanner wrench as illustrated. When adjustment has been completed a locking device holds it securely in position.

Steelweld Shears are loaded with exclusive features that make operation easier and speed production. There are no other shears like them.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

4812 EAST 282ND STREET, WICKLIFFE, OHIO

STEELWELD PIVOTED BLADE SHEARS

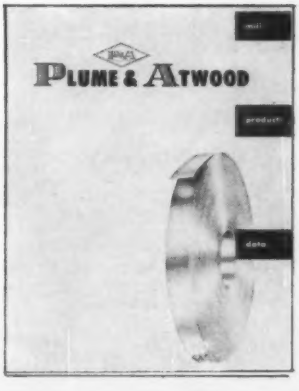
on top of your job at all times...

Your order in the P&A rolling mill is never "lost in the shuffle". Large or small, it is promptly scheduled, promptly started — and shipped as promised! Try P&A for your non-ferrous sheet and strip requirements. Here is a mill big enough to be efficient, small enough to give you personal attention.

Call on us for

BRASS
NICKEL SILVER
PHOSPHOR BRONZE

Write for your copy of our *NEW* Book — MILL PRODUCTS DATA



MILL DIVISION

P&A ESTABLISHED 1869

THE PLUME & ATWOOD MANUFACTURING COMPANY
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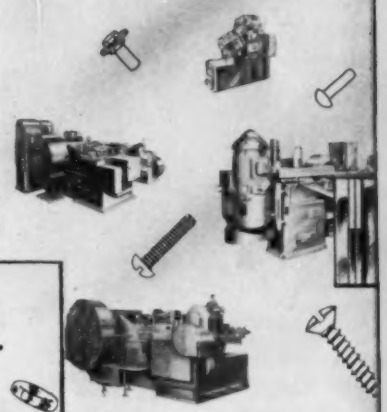
4 WATERBURY FARREL DOORS TO LOW COST PRODUCTION

The men behind these four Waterbury Farrel doors design and build machinery to help you lower your production costs.

Each Waterbury Farrel division has its own fund of specialized engineering talent and experience to draw upon in solving your specific machinery problem. And, each is backed by Waterbury Farrel's reputation of more than a century of successful machine building.

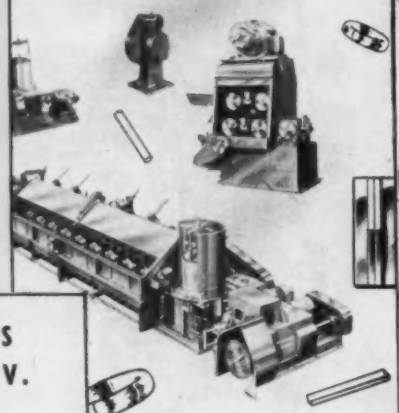
Inside the appropriate Waterbury Farrel door you'll find the engineering skill and ingenuity to evaluate your requirements and provide the proper equipment.

COLD HEADING EQUIPMENT DIV.



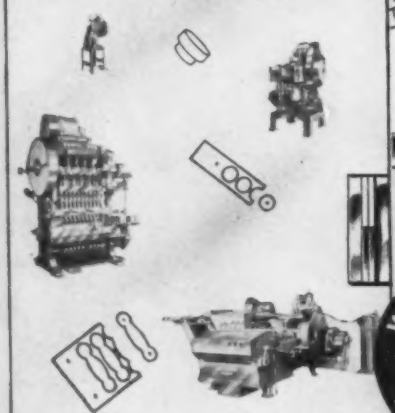
Machinery for mass production of standard and special bolts, nuts, rivets, screws and other cold formed parts.

WIRE MILL EQUIPMENT DIV.



Machinery for the economical drawing of non-ferrous wire in heavy, intermediate and fine wire sizes.

POWER PRESS EQUIPMENT DIV.

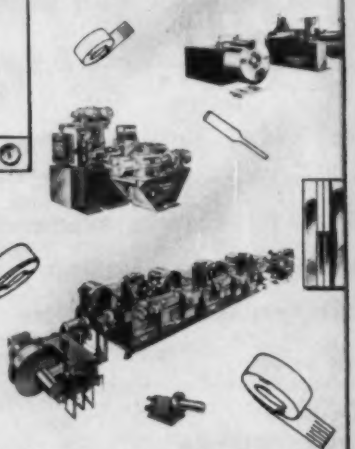


Machinery for quantity production of parts requiring blanking, stamping, forming, deep drawing, threading, trimming, beading or other operations.

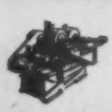
WATERBURY FARREL FOUNDED 1851

Write for free "4 in 1" booklet or contact your nearest Waterbury Farrel office.

ROLLING MILL EQUIPMENT DIV.



Machinery for rolling strip, wire, rod; drawing tubes, slitting sheet stock for production, warehouse or laboratory use.



Bolt, Nut & Screw Machinery

Power Presses

Rolling Mill Machinery

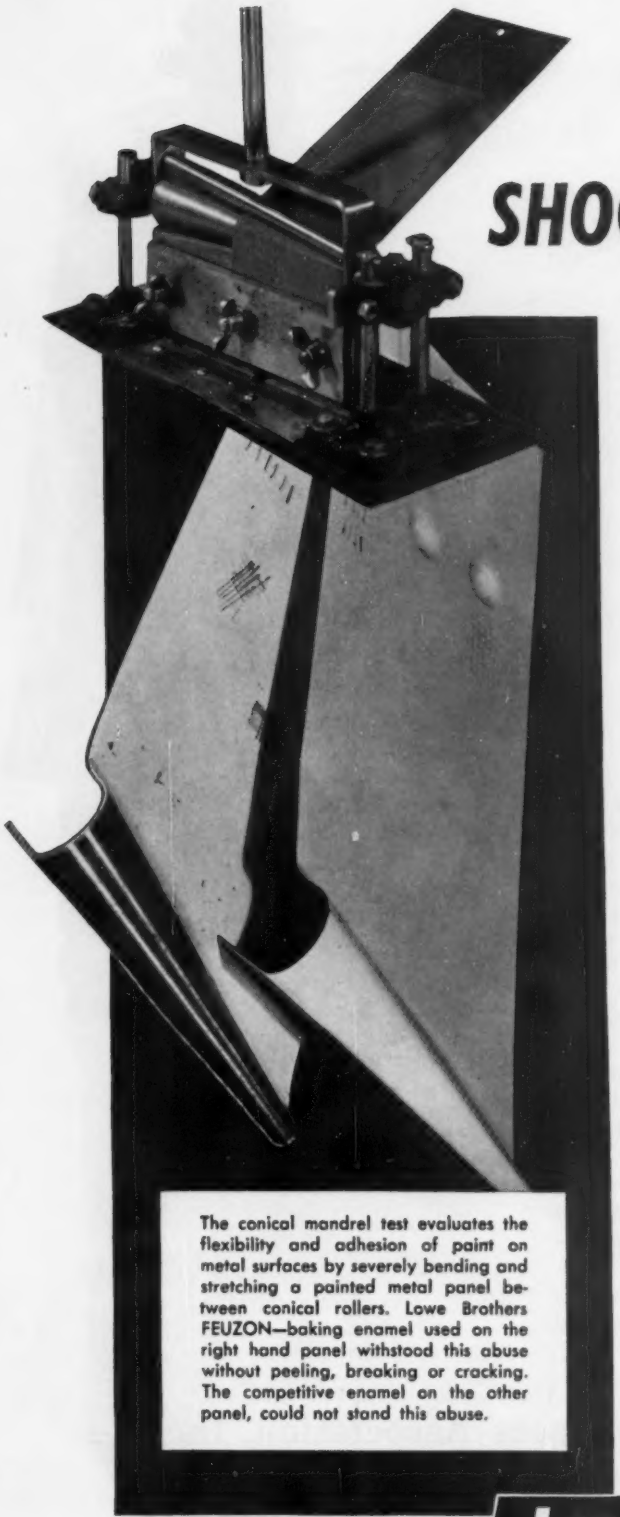
Wire Mill Equipment

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

Waterbury, Conn.

Sales Offices: Chicago • Cleveland • Millburn, N. J.

WF-29



The conical mandrel test evaluates the flexibility and adhesion of paint on metal surfaces by severely bending and stretching a painted metal panel between conical rollers. Lowe Brothers FEUZON—baking enamel used on the right hand panel withstood this abuse without peeling, breaking or cracking. The competitive enamel on the other panel, could not stand this abuse.

SHOCK TREATMENT

..bad medicine for the wrong finish

You can't afford to use anything but the right finish. The second best might be cheaper and look just as good, but it will be more costly in the long run.

The "shock" will come after your product goes into home, office or plant. The finish must not only look good but also be able to take wear and abuse.

The "shock treatment," more severe than any encountered in actual service, is simulated in Lowe Brothers Technical Service Laboratory to determine in advance the reliability of each finish. The two test panels at the left which have been bent and stretched, graphically emphasize that the best paint is the most economical finish in the long run.

To make sure you get the right finish everytime, call or write Lowe Brothers Company, 424 East Third Street, Dayton 2, Ohio.

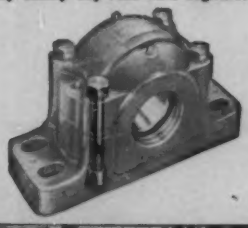
LOWE BROTHERS

INDUSTRIAL FINISHES

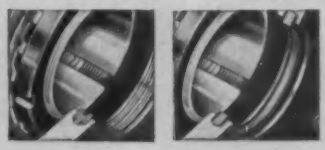
also Style-Tested paints for the home

MORE FACTS on why more and more leading manufacturers choose Link-Belt bearings

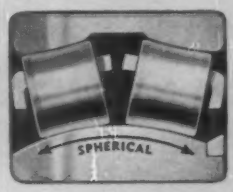
SUPER-RUGGED CAST STEEL HOUSING. Proper positioning of cap on base is assured by large-size dowels. Four heat-treated thru-bolts and serrated steel nuts firmly clamp cap and base together.

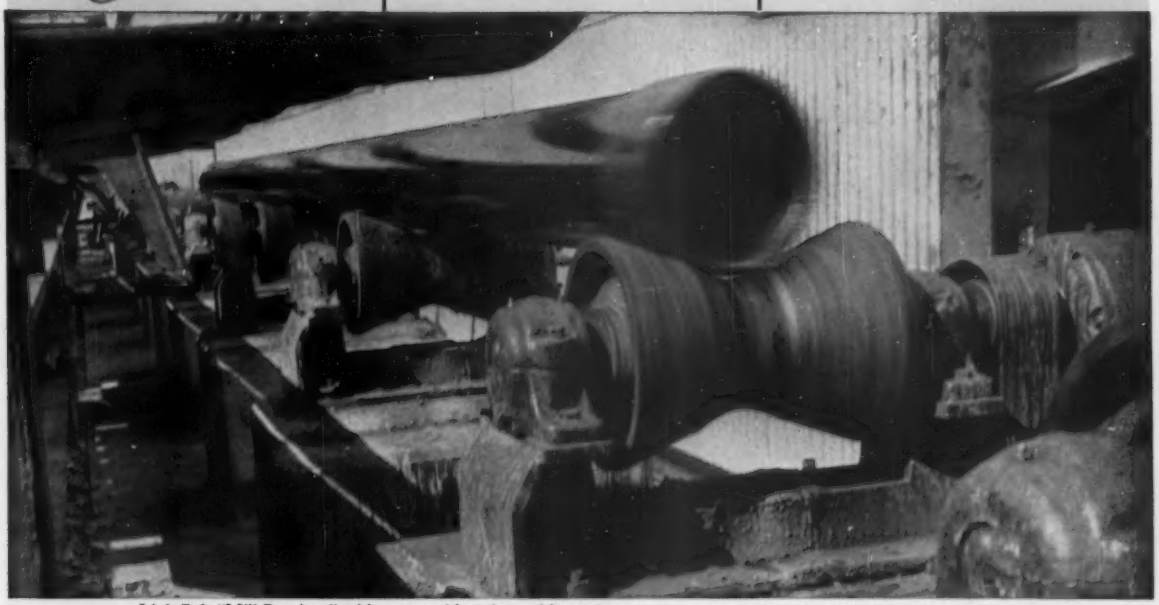


CHOICE OF SEALS. Spiral labyrinth steel seals, left, are for oil or grease lubrication and heat conditions. Combination felt and synthetic rubber contact-type seals, right, for grease lubrication.



SELF-ALIGNING ROLLER BEARING is self-contained and adjusted at the factory—needs no shims or alignment rings at installation. Design assures free rolling under even the toughest conditions.





Link-Belt "Mill Bearings" with cast steel housings withstand severe impacts and heavy loads in this modern pipe mill.

"Mill Bearings" with cast steel housings

designed by Link-Belt to take industry's heaviest loads and hardest impacts

"Mill Bearings" are now available for shafts up to 11 in.

● To stand up to the sudden shocks and impact loads met in steel mills, mines, foundries, oil field applications and on heavy equipment, Link-Belt has designed the extra tough "Mill Bearing." It's the precision Link-Belt self-aligning roller bearing mounted and protected in a durable cast steel housing.

Thoroughly-proved Link-Belt "Mill Bearings" maintain full load capacity even with shaft deflections and misalignment often existing in extremely heavy service. And their simple, efficient design assures long life and free rolling.

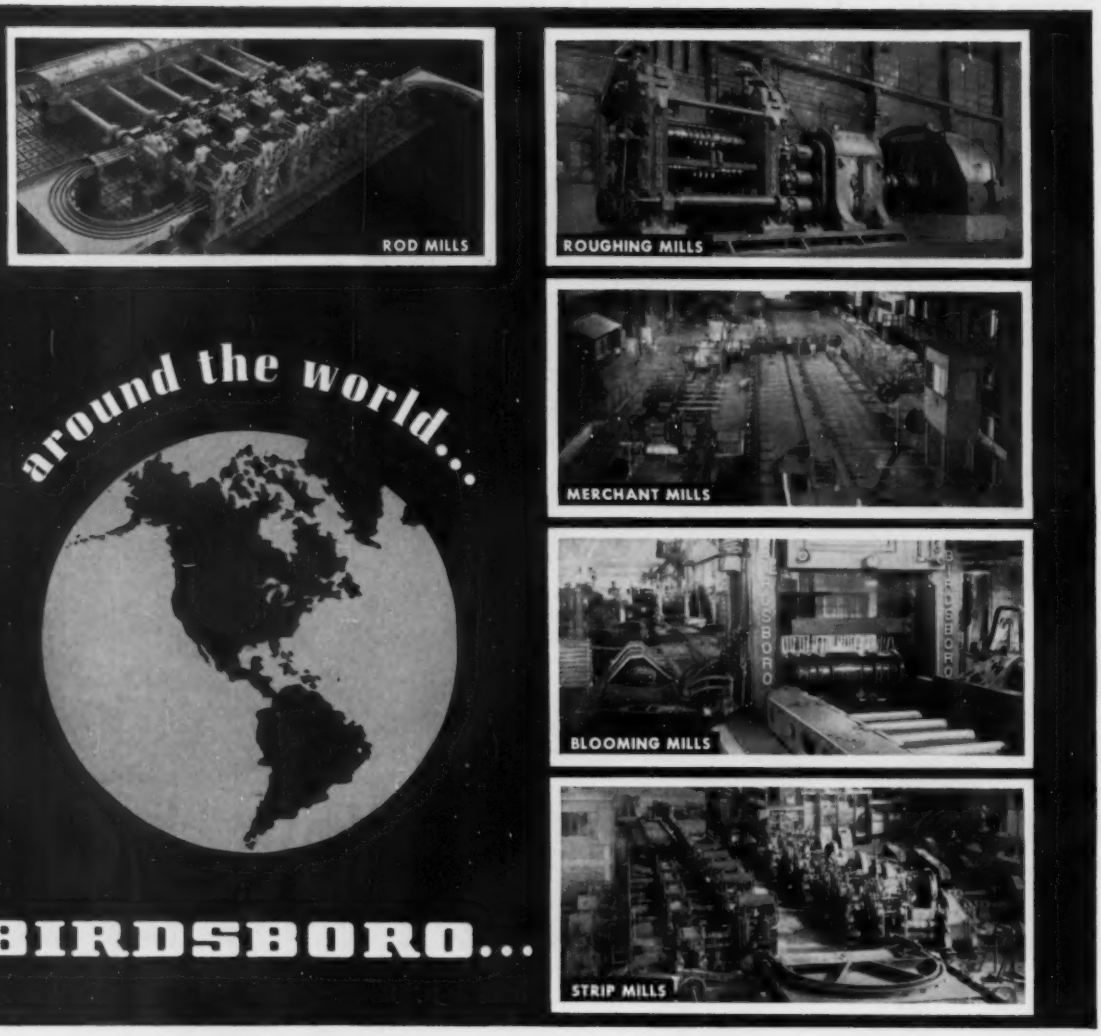
Link-Belt makes industry's most complete line of ball and roller bearing blocks. So whatever you need, you'll find the answer in this quality line. Ask any of the 40 Link-Belt offices or an authorized stock-carrying distributor for Data Book 2550 and Book 2565A on "Mill Bearings."

13.982

LINK-BELT

Ball and Roller Bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



is known for dependable mill equipment!

• Whatever you need in mill equipment . . . wherever you need it . . . BIRDSBORO is ready to give you "customized" service, from the manufacture of a single unit to the design, building and installation of complete mills and auxiliary equipment.

MM43-55R

BIRDSBORO
STEEL FOUNDRY AND MACHINE CO.

BIRDSBORO, PA. District Office: Pittsburgh, Pa.
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STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

When a Lassie meets a Massey

Coming through the Rye

Massey-Harris-Ferguson that is, neighbor, whom you'll find in the rye and the wheat and all over farms 'round the world — because M-H-F products are vital to profits in farming.

And at Massey-Harris-Ferguson resistance welding is just as vital to profits in manufacturing.

The combination of ingenious production engineering and Sciaky resistance welding techniques achieves economy usually associated with mass production . . . *but* it achieves this economy on short runs of a wide variety of parts!

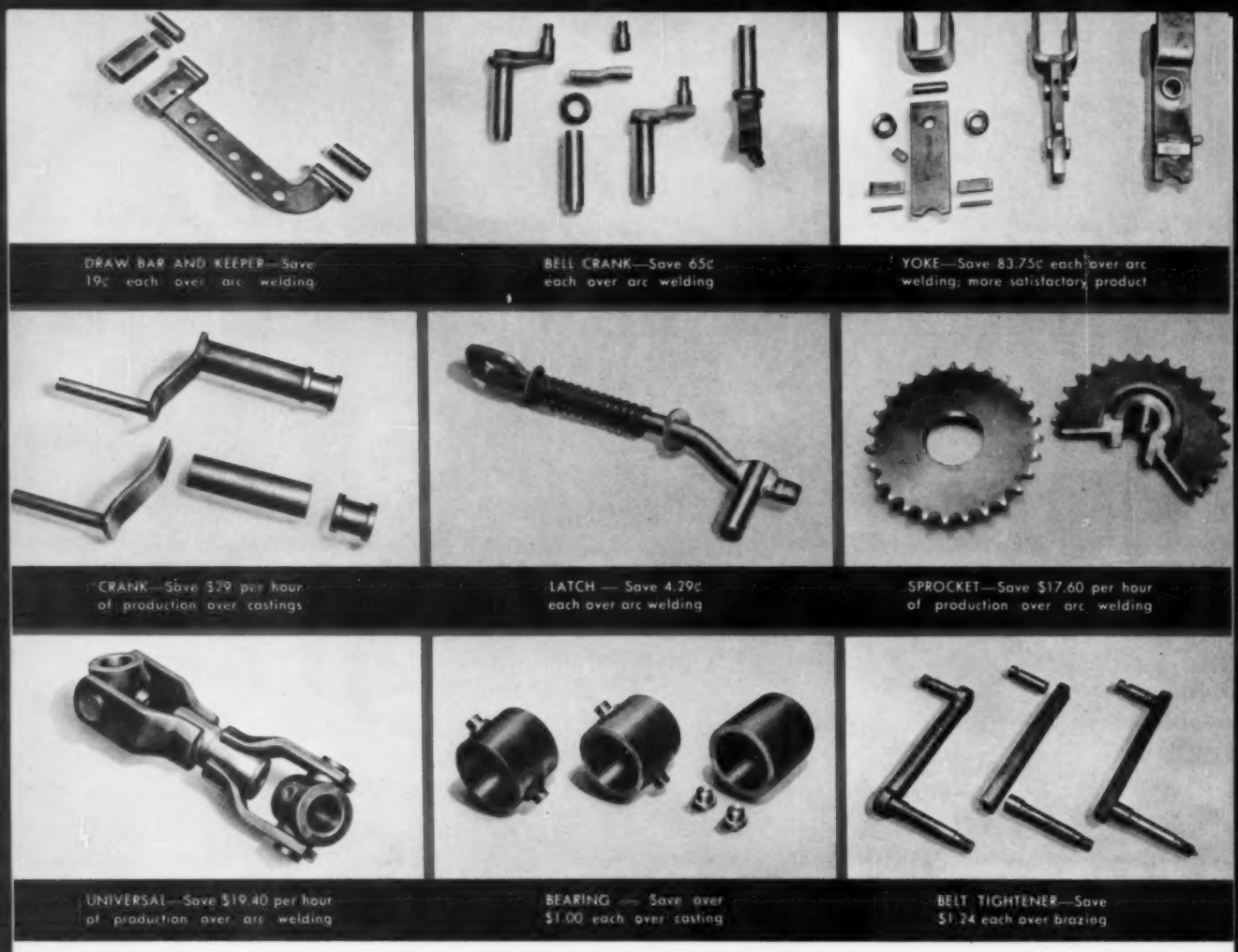
If *you* want to combine mass production economies with short production runs . . . look into Sciaky resistance welding — just like Massey-Harris-Ferguson did!

SCIAKY®

Largest Manufacturers of Resistance Welding Machines in the World

One of Massey - Harris - Ferguson's proudest achievements — the 90 Custom Special Self-propelled Combine.

Turn the page—Take a look for yourself at just a few of the advantages . . .



DRAW BAR AND KEEPER—Save 19¢ each over arc welding.

BELL CRANK—Save 65¢ each over arc welding

YOKE—Save 83.75¢ each over arc welding; more satisfactory product

CRANK—Save $29 per hour of production over castings

LATCH — Save 4.29¢ each over arc welding

SPROCKET—Save $17.60 per hour of production over arc welding

UNIVERSAL—Save $19.40 per hour of production over arc welding

BEARING — Save over $1.00 each over casting

BELT TIGHTENER—Save $1.24 each over brazing

Mass Production Methods with Sciaky Techniques save up to 60% on short run fabrication

Impressive cost reductions are only part of the Massey-Harris-Ferguson story — versatility, speed, and quality combine to result in an unusual success with a wide variety of short run applications.

Over 200 assemblies, formerly fusion welded, cast, or forged, are now made from standard, off-the-shelf stock and screw machine products. Average set-up time for resistance welding is only *30 minutes*. Fixturing costs have been reduced to less than $75.00. The field performance has been excellent!

Three standard Sciaky Three-Phase balanced load welders are used by M-H-F. Control set-ups for any job are quickly made from performance data charts. Production time is never wasted in try-out to prove weld quality.

"Resistance Welding At Work", Vol. 5, No. 1, tells the whole M-H-F story. Write for your free copy of this dramatic proof of Sciaky Basic design thinking — resistance welding techniques to put the profits back into manufacturing.

For specification welding such as required for air frame, jet engine and ordnance manufacture ask about the new Sciaky Predetermined Electronic Counter Weld Control.

One of three standard Sciaky welders in use at M-H-F showing the fixturing for producing a yoke.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY.

Sciaky Bros., Inc., 4924 W. 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600

*consistent quality

is as important in the pin as in the gear

To function effectively, a spring pin must drive easily into holes drilled to normal production tolerances, compressing as driven. To drive easily, hold firmly and fit flush, the pin —*every* pin—must meet the strict requirements of specifications such as those prepared by the SAE and the Military Services.

Since failure of a pin can be as costly as a failure of any other precision part, it is important to check the pins *you* buy for uniformity . . . uniformity of diameter and length, shear strength, hardness, insertion and removal forces, and recovery of diameter.

Rollpin has been tested many times—by many manufacturers—with a consistently high performance record. It has been widely recognized as the "quality" fastener of its type. In this case, quality can be—and should be—measured. We strongly urge that you test for quality when buying spring pins.

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. R28-1277, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send the following free fastening information:

- ☐ Rollpin samples
- ☐ Rollpin bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____

City_____ Zone____ State_____

NEWSFRONT

Fuel Injection: Maybe Later On

The conventional auto carburetor's in no danger of disappearing, despite the rash of fuel injection announcements accompanying the New York auto show. Chances are it'll be around as long as there's a reciprocating engine. Sales projections for fuel injection in '57 are practically nil. Biggest drawback's price. Feeling is the extra tab's just too big for the relatively small gain in performance.

No Oil Shortages Foreseen

Government officials, shaping up a program to ship oil to Western Europe, flatly deny it will mean any shortages for industrial or refining purposes here at home. They're more concerned about transportation; frankly admit the program will put plenty of pressure on tank cars, pipelines and other oil-moving facilities.

New Mill Holds Down Roll Changes

A new specialty bar mill produces 27 different mill products with only 5 roll changes. They credit it all to advance planning and permanent scheduling. Other specifics contributing to efficient utilization of the new equipment are elimination of special edging grooves and forming passes from their operations.

Tips On Flash-Welding Titanium

Low and medium upset pressures give better joints in flash welding titanium, says one Midwestern metalworker. High pressures result in poor bend ductility, even though tensile strength is normal. Also, the operation calls for lower voltages than those used with steel. Observing these points, firm reports, can mean flash welded titanium joints with properties approaching those of the parent metal.

Labor: What's It Apt To Ask For?

What will Labor ask management to pay for in the next 10 years? These items, says one noted analyst: (1) higher basic wages, (2) a shorter work week or its equivalent in more premium-pay hours within the framework of the 40-hour week, (3) longer and broader SUB plans, (4) bigger pensions, (5) more insurance against hospital and doctor bills, (6) better employee housing and, (7) college educations for children of employees.

Boom Shaping Up in Gas Pumps?

Third gasoline pumps to handle higher octane fuels may be a big market item in 1957. Petroleum people regard the third pump—already in some East Coast stations—as the coming revolution in the retail gas industry. Attempts to get by with existing equipment by mixing high and low octane gases at the pump haven't panned out. Hence, a need for more tanks, pumps, metering, valve equipment for gas retailers—and soon.

Toward Standard Curtain-Wall Sections

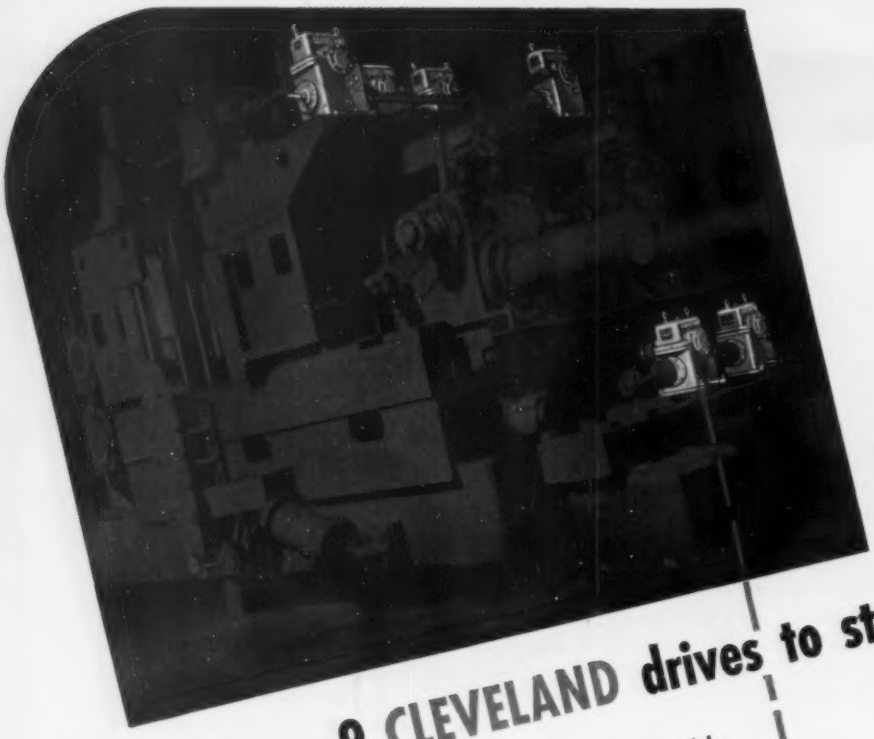
Popularity of standard sections for curtain wall construction is up—and steelmakers are cheering. Supplying stainless, porcelain enamel and carbon steels in custom-built section sizes has meant relatively high tooling cost. With standard sections and volume production, tooling cost per unit drops subsantially. Prices can dip correspondingly and under use of such sections will be encouraged.

Army Helicopter Spreads Wings

Flights of a new utility helicopter for the Army will get underway soon. The Bell H-40 craft is the first rotary wing plane designed to be powered by turboshaft engines. It will cruise at 100 knots, have a 1000-lb payload. Delivery date: sometime in 1959.

Tax Collectors Try Telephoning

Tax collectors in Federal Revenue Service's Georgia District are taking a new tack in trying to get tax delinquents to pony up—they're reaching for telephones. They start this week, hoping personal phone calls will work better than franked letters have in persuading delinquents to come in and talk. As of Sept. 30, some 1.5-million citizens owed nearly $966-million in back income taxes.



Six of nine Cleveland Worm Gear Drives in use on the Anvil Lift Drive of this Mesta Gag Press are in view.

Gag press uses 9 CLEVELAND drives to straighten steel

BIG equipment . . . doing a big job. Smooth, powerful, dependable speed transmission is vital here—and this gag press, designed and built by Mesta Machine Company, has it . . . thanks to 9 Cleveland Worm Gear Drives.

Cleveland Worm Gearing—the dependable drive—affords exceptional advantages for practically any power job. Steel worm on bronze gear provides the best possible medium to transmit power with minimum friction and wear—reduces motor speed evenly, efficiently and quietly. Right angle drive makes a worm gear reducer compact and rugged, with few moving parts. And when it's a Cleveland, you get extra benefits from 44 years of experience concentrated on making worm gear drives.

Get the full Cleveland story on power transmission. Write for Catalog 400; ask for technical advice on any problem you may have. Then, you'll specify Cleveland Worm Gear Drives. The Cleveland Worm and Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

Scrap Yard Operators Buy Lots of Equipment

	This year they bought:	And planned to buy in '57:
Cranes	$19,596,000	$12,721,000
Balers	14,369,000	16,042,000
Trucks	10,202,000	6,317,000
Magnets	2,343,000	1,321,000
Scales	2,060,000	1,518,000
Shears	1,328,000	2,682,000
Other	4,046,000	4,988,000
Total	53,944,000	45,589,000

A $50 Million Capital Goods Customer

The industry will spend some $54 million this year . . . Trend to mechanization of yards founded on higher tonnages, need to trim labor costs . . . Survey pinpoints expenditures—*By J. B. Delaney.*

◆ WITH FEW EXCEPTIONS, the iron and steel scrap industry in the U. S. is made up of hundreds of small businesses. Even some of the bigger companies come fairly close to the Government's definition of small business.

But collectively the industry is big. This year a record 36 million tons of purchased scrap will have passed through dealers' yards, and through brokers from big industrial plants and railroads, to the nation's steel mills. Another 5 million tons will have been shipped to Europe, Asia, South America, and Canada. That's also a new record.

The industry has had to keep pace with expansion of its biggest customer—steel. But it has had to look twice before it leaped.

For instance, scrap has to keep close tab on expansion of blast furnace capacity because blast furnaces mean more hot metal (iron) for the openhearths. And if a steel company is long on blast furnace capacity, it will use less scrap, particularly if the price of scrap is high.

The industry has to gauge the ups and downs—and long-term trends of industries that use steel. Because as these industries go, so goes steel. And as steel goes, so goes scrap. A wrong decision could be disastrous.

Big Spenders

Despite these uncertainties, the scrap industry has been investing heavily in modernization and expansion since the war. Individual companies have seen the handwriting on the wall and installed capital equipment in line with expansion of the mills they sell to.

To put a finger on capital equipment spending by scrap companies, THE IRON AGE surveyed some 1300-odd members of the Institute of Scrap Iron & Steel.

On the basis of replies to THE

What Scrap Yard Operators Are Thinking About

"A complete inspection of every third or fourth car with the mill's opinion as to quality, preparation, loading etc. A report to the dealer."

"The scrap industry (those who are progressive) and its members, are striving for better service—for its various customers. We believe this program is commendable and deserves recognition."

"High cost of labor—equipment and maintenance has been reducing my net."

"We want faster depreciation allowance on hydraulic baling presses."

"A better system of standards on scrap—including an industry tolerance — would promote better relations vis-a-vis dealers and mills."

"We find that a field representative, representing equipment manufacturers, is needed. This representative could discuss technical problems involving equipment from his firm."

"All equipment purchased presently is purchased at record high prices."

"Suppliers: Design equipment and safety protection specifi-

SPECIAL REPORT

IRON AGE questionnaire, iron and steel scrap yard operators will have spent some $54 million on capital equipment this year. These same companies plan to spend a conservative $45.6 million for the same purpose in 1957.

Cranes and Balers

The survey shows that of total equipment spending in '56, some 36 pct, or $19.6 million, will have gone into new or used cranes. This probably reflects (1) the need for more mechanization to handle greater tonnages, and (2) a desire to offset higher labor costs. For these same reasons, about $10.2 million will have gone into trucks (materials handling and over-the-road), or 19 pct of the total.

Balance of capital spending in '56 will have gone into balers (27 pct), reflecting increasing tonnages of automotive bodies and trimmings from other industrial operations; and into magnets, shears, scales, and miscellaneous.

Of the $45.6 million earmarked for capital spending in 1957, balers will account for $16 million, or 35 pct, compared with the 27 pct allocated for this purpose this year.

Second largest expenditure next year will be for cranes — some $12.7 million, or 28 pct of the total. Spending for trucks will account for $6.3 million, or 14 pct. Shears, scales, and magnets will follow in that order. Miscellaneous spending will account for nearly $5 million, or 11 pct of the total.

Calling the Roll

THE IRON AGE survey questionnaire was mailed to 1386 members of the Institute of Scrap Iron and Steel. With exception of 60 companies which function as brokers only, all are yard operators.

Replies were received from 182 companies, representing a return of 14 pct. Tonnage handled by these firms this year will total approximately 4.5 million tons, or 17 pct of the 26 million tons moved through all yards. Balance of this year's 36 million tons is channeled directly from industrial plants to the mills.

On the basis of this sample, dollar figures spent or earmarked for purchase of capital equipment were projected for the entire industry.

As an industry, iron and steel scrap has grown steadily in terms of member companies and in volume of business handled. It also is growing up in other ways.

A $2 Billion Industry

Through the Institute, which makes its headquarters in Washington, the industry is polishing up its public relations techniques. It is doing an effective job of combatting discriminatory and outmoded legislation affecting its members. It is fighting for a better shake on freight rates. It is gaining recognition as a manufacturing industry. And it is putting its own house in order.

Scrap this year approached the status of a $2 billion industry. Tonnage handled by the 3800-odd dealers and brokers, including exports, will approximate 41 million tons—a record.

In 1948, 2620 dealers reported sales of $1.7 billion; in 1939, 1869 establishments had sales of $334 million, and in 1929, 600 companies grossed $208 million. The 1954 Census of Manufactures, just released, lists 3719 dealers with sales of $1.2 billion.

A year ago, the Institute hired its first full time public relations director—Bill Story—and stepped up its PR program, internally and externally. Prior to that, the Institute's executive vice president, Ed Barringer, handled both PR and administrative details.

What It's Doing

Here are some of the programs the Institute is pushing:

It has just distributed 3500 copies of Mr. Barringer's book, "Story of Scrap," to universities, colleges, and libraries. It is stepping up circulation of its movie, "Scrap: Steel Reborn," to schools and industry groups. Local Institute members are available for short talks wherever the movie is shown. It is working up a script

cally for scrap yard use. Customers: A more evenly planned system of buying scrap."

"Export prices should be quoted separately."

"Naturally, any expansion is predicated on a continuation of business at current levels."

"If they don't loosen money we won't be in position to buy any equipment."

for a second movie bringing the industry's story up to date.

It is gaining public recognition as a manufacturing industry as opposed to an industry that merely deals in a commodity. It has won several court rulings to this effect on the basis of its heavy investment in capital equipment, a fact borne out by THE IRON AGE survey. A baling press alone represents an investment of $300,000, installed.

Internally, it is cracking down on the "bad actors" in the business. It has set up a Fair Trade Practices Committee to deal with firms that deliberately "pad" bundled scrap with everything from paving blocks to garbage. One such offender was just recently suspended from the Institute for 30 days after a thorough inquiry established that he had deliberately contaminated bundled scrap. A second offense would mean expulsion from the Institute.

The moral sanction of suspension or expulsion is about as far as the Institute can go. But legitimate dealers as well as the steel mills that buy scrap would think twice before doing business with a two-time loser.

The industry is wading hip deep into the matters of local restrictive ordinances, particularly those aimed at smoke control. The Balers Committee is working with manufacturers in a search for an incinerator dealers can afford and which will be effective enough to satisfy smoke control authorities.

The Institute is fighting for repeal of ordinances, put on the books years ago, that place dealers in the same class as the pawn broker and the junk yard.

Safety Program

On freight rates, the Institute has mapped out a three-pronged attack: (1) for reduction of rates, particularly on long hauls from the South to the North, (2) for revised freight rate classifications on scrap, and (3) to prevent an increase in demurrage rates. In company with other industries, it has opposed the general freight rate increases asked by the railroads.

The Institute has been successful in lowering workmen's compensation rates for scrap companies in 14 or 15 states, and expects adjustments in other states. In line with this, its safety program has succeeded in reducing accidents to the point where it received an award from the National Safety Council for effectiveness and excellence.

The growing up process has carried the industry into the field of scholarships aimed at bringing more promising students into engineering. These programs have an incidental goal of attracting more engineers to the scrap industry, but there is no compulsion on this score. The Institute's Chicago chapter has established a $1,000 scholarship at Illinois Tech for a son or daughter of an employee of a scrap yard. But if an employee's child does not qualify, competition is opened to outsiders. The Cincinnati and South East chapters also have set up scholarships, and the Gulf Coast has organized a committee to consider the question.

Purchased Scrap: A New Record In '56

Includes industrial and railroad scrap

Source: Institute of Scrap Iron & Steel

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

PRICING

NICKEL: What Price Stainless?

Increased price of primary nickel sure to boost price of stainless steel by early 1957 . . . Expect change to be new extras . . . Anticipate no major change in buying pattern in favor of low nickel series.

See last-minute bulletin P. 178

◆ HERE'S WHAT the recent increase of 9½ per lb in the price of primary nickel will mean in the stainless steel market.

The higher price for nickel, 74¢ per lb., just about cinches a boost in the price of stainless early in 1957.

From here on out it will cost producers just under one cent per lb more, if they use all primary metal, to make type 302 stainless steel. If they use scrap it could cost them more since the now astronomical price of scrap is expected to go even higher.

No major switch to chrome stainless away from nickel-bearing is expected.

Not Alone

On the matter of a stainless price increase, major producers say that the higher nickel price is not the major factor. Higher cost of scrap, pig iron and ferroalloys started the wheels turning in this direction some time ago. The nickel increase is merely the last straw. Indications are that stainless increase could be new extras or higher base price.

Scrap situation is causing more furrowed brows than the nickel price increase. The price of stainless scrap is now $500 per ton, more than three times as much as primary metal per lb of nickel contained. "If they were charging $500 before, what will they ask now?" worried one producer.

Major mills expect no change in the pattern of stainless buying. Reason: Customers buying strictly on price have already switched to the 400 or 200 series. Others won't change because the difference will be a matter of a few cents per lb.

Wider Differentials

Price differentials between high and low nickel grades does not reflect current scrap costs, say producers. Type 302 sheets (high nickel) cost 2½¢ per lb more than type 202. Type 303 sheets are 9½¢ over type 403.

There is some speculation that new prices might show wider differentials. But it is not expected to bring any big buying shift.

A different aspect of the nickel price picture is its effect on stockpile diversions. Starting Jan. 1, all nickel contracted for the stockpile is supposed to be diverted to industrial users.

According to one report, the diverted nickel is being held up by a price squabble. The question is whether the official price will be charged or the open market price. Stainless producers are scrupulously avoiding any comment on the dispute. They want the diverted nickel, no matter what the price is.

Their anxiety centers on time. Reportedly, some commitments have been made by mills on the basis of increased nickel allotments. And new stainless facilities will be ready for operation early next year. With December well along, the missing nickel is beginning to worry the mills.

Another big question is exactly how much nickel will be diverted. Under existing programs, a sizable amount has already been bypassing the stockpile.

Despite their anxiety stainless producers expect to receive more nickel once the stockpile kink is straightened out. They don't feel the added poundage will be enough to meet all needs but it will certainly help.

Long Range Nickel Outlook Bright

- **Total free world nickel capacity will be 600 to 625 million lbs. by 1960, says Henry S. Wingate, president of International Nickel Co.**
- **This is exclusive of the 50 million lbs. forecast from the U. S. government plant at Nicaro, Cuba.**
- **This would be an increase of from 175 to 200 million lbs. over total output from all sources in 1955.**
- **It is 325 million lbs. more than entire free world consumption for the 12 months ending September 30, 1956.**

Arkansas Move

Clary Corp. is building a plant at Searcy, Ark., 50 miles northeast of Little Rock, for production of adding machines and cash registers.

The expansion will allow the company to use space at its San Gabriel, Calif. plant for new product development. Moving of production lines will be done gradually after the Searcy plant is completed about May, 1957.

The company recently opened a plant in Toronto, Canada, and is preparing to establish another in West Germany to supply European distributors.

More Nickel:

Inco will boost output by 130 million lbs.

International Nickel Co. will spend $115 million in the next three or four years to boost its nickel capacity by 130 million lbs per year.

Keystone of the project is the opening of two new nickel mines in North Manitoba, Canada to be known as the Thompson and the Moak Mines. It will be second only to the Sudbury works as the world's largest nickel producing setup.

The Manitoba Hydro-electric Board will back Inco's move with a new power setup to cost $32 to $38 million. And the C. N. R. Hudson Bay Line Railroad will put in a new 30 mile spur at a cost of about $5 million. To complete the project, Inco will invest $20 million to build a town big enough to house 8000 workers.

Replace Stockpile

Of the additional capacity, 24 million lb will replace the premium priced metal now being produced at the company's Sudbury, Ontario plant for the government stockpile. This means that by 1960, 106 million more lbs will be available to industry.

In order to get the project rolling Inco will supply all of the necessary initial financing. The province will borrow $20 million for four years in order to start construction of the power plant at Grand Rapids on the Nelson River. Current plans call for the output of enough power to supply other industries as well as International Nickel.

Government Cooperation

The railroad will borrow at least part of the funds necessary for construction of the spur line.

Since the project will be by far the largest single investment in the province of Manitoba, the local government was consulted in all stages of planning.

The new town and the plant will both be named Thompson in honor of Dr. John F. Thompson, International Nickel's chairman of the board.

MANAGEMENT

CAREERS: When Do You Switch?

Dave Austin, U.S. Steel vice president, finds the answer at 58 . . . Others have made similar decisions and the trend may be growing . . . Motives often misunderstood.

◆ IT IS ROUTINE for government people to enter business. It is becoming common to see businessmen enter government services. For years professors have taken their place in industry.

Every once in awhile along comes someone who by his very action makes you stand up and take notice. That is the case now with a top executive of a top steel company stepping out at the height of his career.

Dave Austin, executive vice president—commercial, U. S. Steel Corp., is going into the teaching and speaking field. After 39 years with one company and a big industry Mr. Austin is going to do "some of the things I have wanted to do."

Richard F. Sentner, now assistant executive vice president, commercial, succeeds Mr. Austin. Mr. Sentner's wide steel experience includes 3½ World War II years as Deputy Director, Iron & Steel Div., WPB. From March to September of 1951 he headed that division on NPA.

Harvard Bound

The rumors will fly thick and fast but will bear no fruit. The reason for this action of one of the country's top commercial experts is simple. It belies the complex build-up-knock-down technique of the office politicians.

Mr. Austin will make his teaching contribution to Harvard's Graduate Management School. He will soon join the staff as a part of the advance management course. His lectures will reflect a practical outlook.

Strong Motives

Dave Austin is the outstanding career man in U. S. Steel. Like a proverbial Horatio Alger, he started as office boy in the New York office of the company. He rose to his present job in successive and well-earned steps.

Years ago his job with U. S. Steel involved the establishment of a new commercial policy—treat all customers alike. Free from discrimination is the way Mr. Austin likes to phrase it when you get behind this man and see what makes him tick.

Like all others who set their

David F. Austin

sights high, Mr. Austin has gone much farther than he would have had he not made a religion out of his goal. Just as he has not always been understood in his quest for a better industry so will he not be clearly understood in his latest decision.

It is unusual for a successful man at the age of 58 to up and don the school room garb. Behind such a move—that has been met with kindly and strong counter pressure—lies a stubbornness of purpose which may be a "preview."

It may not be long before many other top industrialists and business people forsake the power and the glory of the business world for the classroom. You never can tell.

BUSINESS

AUTO SALES: Seven Million In 1957?

After getting burnt in 1956, industry executives are conservative but agree that next year might be the industry's second best . . . The big ifs are consumer credit, production bugs, world peace—By *T. L. Carry*.

◆ WITH THE RESUMPTION of the national automobile show in New York, industry executives have taken the occasion to use the display as a sounding board for their pet pastime—predictions.

Amid the glamor of the show itself and a surface coating of brotherly love, the various company presidents are off to a flying start.

One thing stands out. Although these men are still characteristically bullish, their attitudes this year are tempered with a generous sprinkling of caution.

George Romney: He won't say definitely.

Curtice Is Definite

L. L. Colbert, president of Chrysler Corp., says that the 1957 market could be the second biggest in history. Mr. Colbert does not say how big.

Even George Romney, president of American Motors Corp., who came close to the size of the 1956 market last year, won't say definitely how many cars will be sold in 1957.

Harlow H. Curtice, president of General Motors Corp. and long considered the nation's number one forecaster, unlike his two colleagues says that U. S. factory sales in 1957 will total 6.5 million cars and 900,000 trucks. Combined with Canada, total industry production should be close to 8.3 million.

In all three cases, these men, although not pessimists, are more realistic in their approach.

A Bitter Lesson

Mr. Curtice had to revise his original 1956 prediction downward last spring. He doesn't want this to happen again.

The caution is understandable. Industry leaders were seriously burned during the 1956 model run. Sales were lamentable. New car stocks piled up to such an extent that production schedules had to be cut drastically. Nobody wants this to happen again.

Still, it appears that these executives may be leaning a little too heavily on the conservative side.

From the present condition of the market, an estimate of 6.5 million cars may have to be revised upward sometime during the new year.

As Tom Campbell IRON AGE editor-in-chief, pointedly asked Mr. Curtice at GM's press conference:

"What are the chances of your revising your predictions upward about next May 1?"

"Nothing would please me more." the GM president replied.

Take a look at what has happened so far. Fourth quarter production this year is going to fall about 100,000 units short of original schedules.

H. H. Curtice: Will he revise upwards in May?

Too many bugs in new car production have popped up to plague manufacturing engineers. But indications are that the pipelines are gradually beginning to fill.

At the same time, people are standing in line waiting for some makes of cars and there is an actual shortage in some lines. This could have the effect of whetting the public's appetite.

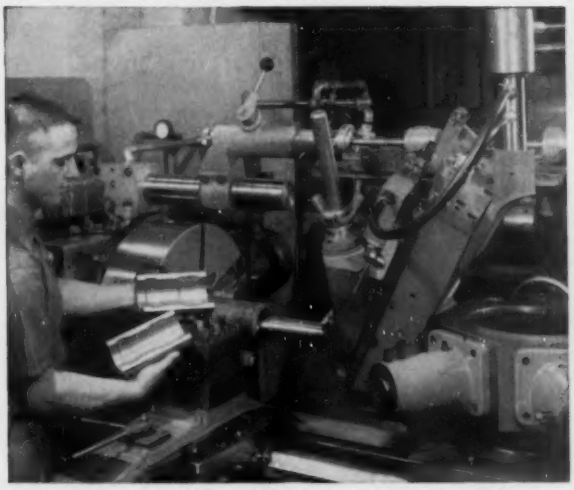
It could set off a buying spree that could lead to a calendar year production in 1957 of close to 7 million cars.

There are two factors that could upset the market. One is the condition and availability of installment credit. The other is the international situation.

The installment credit picture may not be as bad as some people think it is. It's true that some car buyers fell for gimmicks in 1955. But the majority bought cars on either a 24 or 30-month plan.

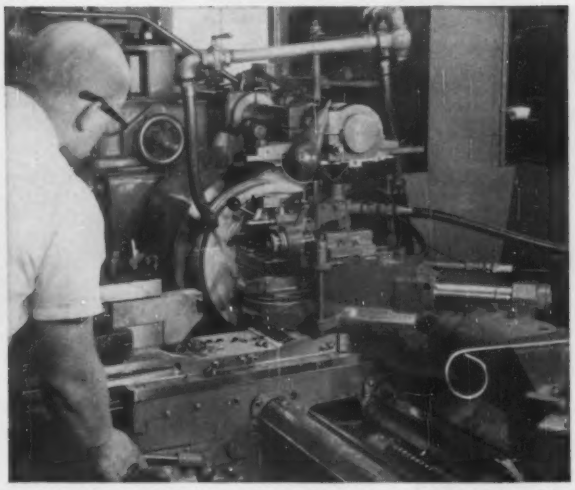
This means that sometime next year most of these cars will be paid for and the owners are likely to come back into the market because their cars are now paid for.

Available on Warner & Swasey 3-A and 4-A Saddle Type Turret Lathes.



NEW WARNER & SWASEY HEXAGON TURRET CONTOURING SLIDE TOOLS—Exclusively designed for contour boring work.

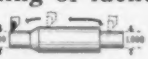
Available on No. 5 Ram Type and 2-A, 3-A and 4-A Saddle Type Turret Lathes.



WARNER & SWASEY CROSS SLIDE CONTOUR ATTACHMENTS—The only turret lathe contour attachments that give you both *contour turning* and *cross center contour facing* in one unit.

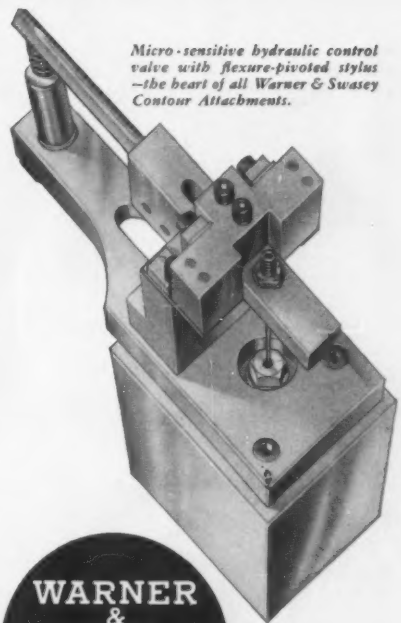
There is a difference in contour attachments

ON WARNER & SWASEYS, the difference is BASIC CONTROL. Translating the touch of the tracer stylus on the template to a precise, powerful cutter feed on the workpiece is the job of the "Micro-Sensitive" control arrangement used on all Warner & Swasey contour devices. A unique flexure-pivoted stylus and an instrument-quality hydraulic control valve provide unmatched sensitivity, fast response, and accuracy in the action of the contour units.

These controls eliminate lost motion, assure precise return of the cutter for exact machining of identical diameters that are separated like this: 

Ninety-degree faces like this  are made flat and square, properly located longitudinally on the part without need for compensations in the template form—template and part contours are exact duplicates.

Exceptional accuracy of these controls is matched only by Warner & Swasey's dependability and rugged construction. Individual laboratory inspection assures the quality of each "Micro-Sensitive" control valve.



Micro-sensitive hydraulic control valve with flexure-pivoted stylus —the heart of all Warner & Swasey Contour Attachments.

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Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

AIRCRAFT: Sales Gaining Altitude

Commercial jet transport contracts are coming in fast . . . But the big money is in military orders . . . $9 billion a year in defense contracts is expected by 1960 . . . Guided missiles growing in importance.

◆ MILITARY SPENDING will continue to be the difference between feast and famine in the aircraft industry.

Since before World War II, planemakers have relied heavily on government contracts for revenue. And despite a current boom in commercial jet transport orders, military work is still the main source of income for most producers.

Pentagon planning calls for the most powerful and up-to-date air force in the world. Spending will hit $9 billion per year by 1960, $12 billion by 1965 and $14 billion by 1970.

A shift to guided missile use means production tooling in the industry will undergo many changes in years to come. These weapons are now adjuncts to manned aircraft. But the day isn't too far off when the nation's striking power will rely almost 100 pct on missiles, say some experts.

In the field of commercial transport, since 1955 planemakers have obtained orders for 600 jets and turboprops worth over $2 billion. This work will keep the plants humming through 1960.

On top of this, there's another $7.5 billion in commercial orders in the cards for the next 15 years.

When aircraft buying is traced back into supplier industries, it proves to be a big customer for metalworking. The industry eats up 20 pct of the nation's annual aluminum production; ½-million tons of steel alloys, carbon steel, copper and copper base alloys. It is a huge market for machine tools, equipment and services.

1957 Even Better

Today the aircraft industry has a $17.2 billion backlog, only 9 pct under the 1953 post-World War II peak of $18.9 billion.

Outlook: Work will stay at top speed in 1957, and probably for many years beyond. Sales in 1957 should reach $8.5 billion, up slightly from the $8.3 billion in 1956.

Value added by manufacture jumped from $1.2 billion in 1947 to $8.3 billion in 1954, according to the 1954 Census of Manufactures. In 1956, value added is estimated at $5 billion.

Employment Grows

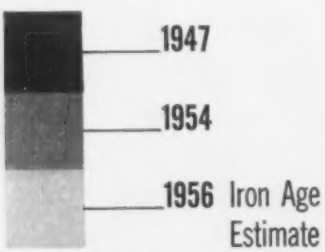
However, it should be noted that 1947 was the post-World War II low point in airframe weight produced—29 million lb. In 1956 the total was 125 million lb and should hold at that figure through 1957.

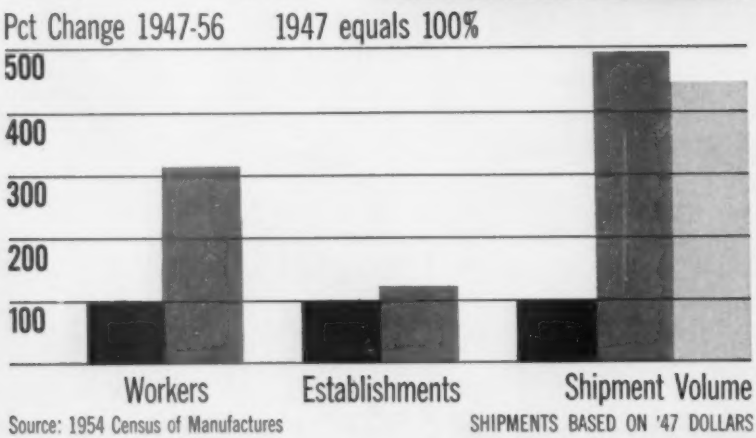
Between 1947 and 1954, employment climbed from 146,600 to 475-, 600—an increase of 212 pct. The number of companies increased from 58 to 72.

Aeronautical engineers are at work on planes that will fly at speeds beyond 3000 mph. Tomorrow's planes will require new materials, machine tools, processes, and equipment.

It all means bigger business with more complex requirements.

Air Age Makes New Business





Source: 1954 Census of Manufactures

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

SIXTH OF A SERIES

Customer's Report

"We cut our Process Inventory by 40% when we switched to single stack annealing"

The cost of process inventory is just as much a capital investment in the annealing department as are the furnaces, buildings, etc. For example, one customer with a 50,000-ton-per-month operation found the Lee Wilson Single Stack Furnaces required $500,000 less in process inventory than did an equivalent four stack installation. A 40 percent reduction!

The answer: Lee Wilson Single Stacks have a much higher production rate. Using Single Stack furnaces, six pedestals can do the work required of 10 pedestals where four stack furnaces are used. This means fewer pedestals are needed to anneal a given tonnage, and correspondingly less steel required in the annealing department.

Here are dollars you cannot afford to overlook! Why not have a Lee Wilson engineer fill you in with all the facts on the most efficient annealing furnace ever developed — The Lee Wilson Single Stack.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS

Lee Wilson* **ENGINEERING COMPANY, INC.**

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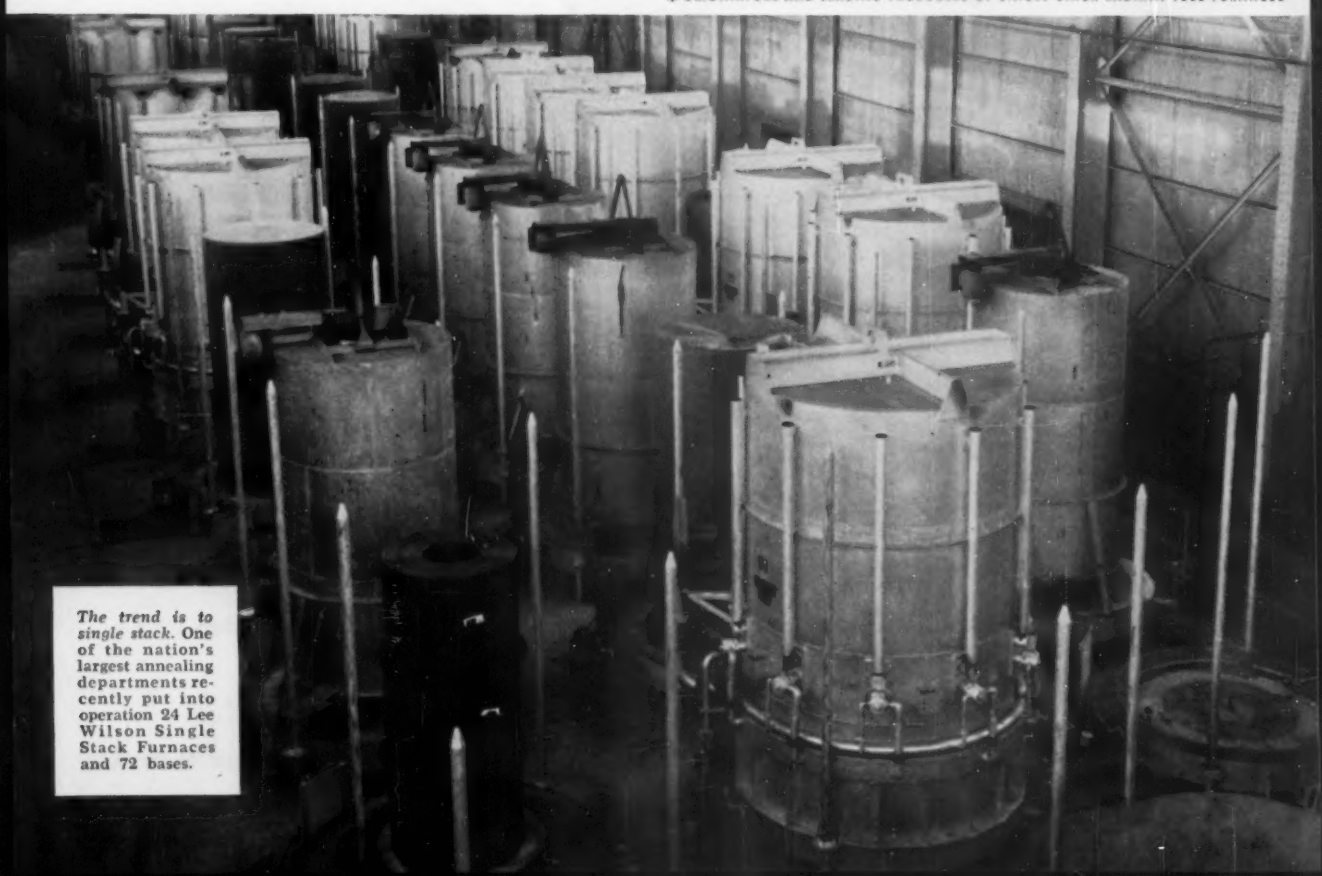
SINGLE-STACK RADIANT TUBE ANNEALING FURNACES

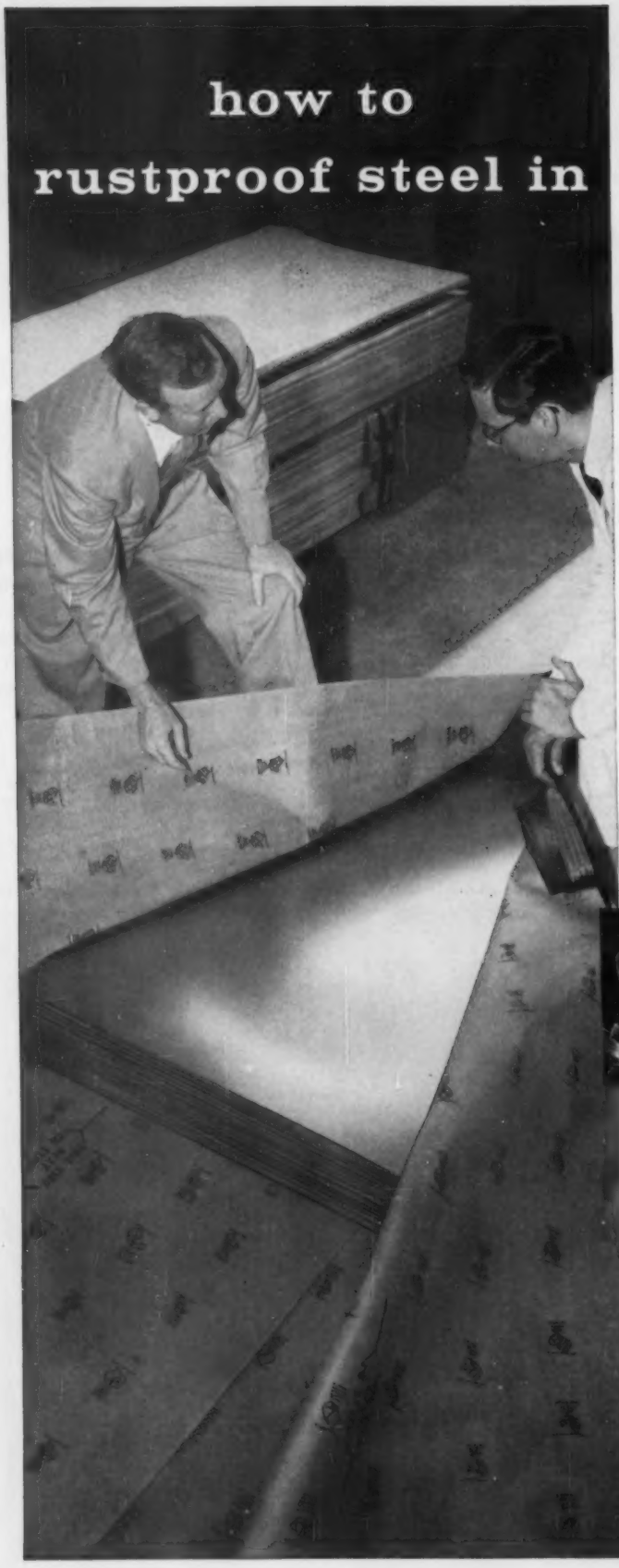
MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES



The trend is to single stack. One of the nation's largest annealing departments recently put into operation 24 Lee Wilson Single Stack Furnaces and 72 bases.

how to rustproof steel in warehousing



When unusual times and conditions make it necessary for you to warehouse any kind of steel, even such sensitive steels as black plate and cold rolled, here's how you can combat the rust problem. Wrap your steel in Ferro-Pak, Cromwell's volatile corrosion inhibitor paper. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.

How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK®

by Cromwell

For over 38 years—
"Paper Engineers" for Steel

REPORT TO MANAGEMENT

Trouble Ahead for FRB

Even though champions of the Federal Reserve Board are taking credit for halting inflationary trends, critics still abound. The traffic in arguments gets more complex.

The FRB will face a stiff tirade in Congress before long, led by its arch foe Rep. Wright Patman of Texas. This time Mr. Patman will have plenty of supporters both in and out of business.

The big argument coming to the fore does not involve the discount rate alone. It covers the entire question of what is and what isn't inflation. Many critics of FRB claim it is using its power to fight something that isn't controllable with FRB tools.

Some vocal people already have made it plain that they think the FRB waits too long to pull back its horns. But others say that the FRB keeps the required reserve percentages too high.

They argue that the need for money in our present day economy is such that some of the old fashioned ideas must be brought up to date. What's more, they predict that sooner or later the reserve requirements must come down sharply.

A Possible Solution

But the so-called moderns in the tight money controversy are themselves attacked by those who say the rules haven't changed. And so the argument goes on and on with the FRB in the middle.

That's why one suggestion made by a prominent Chase Manhattan Bank official, Robert H. Craft, newly installed president of the Investment Bankers Assn., makes a lot of sense.

Mr. Craft, who has had plenty of experience with Federal Reserve matters, suggests a Presidential Commission to study credit.

He makes an interesting point— The economy is running at capacity; if business credit demand is not being met out of true savings, creating more money will simply raise prices. In other words, the FRB is ministering to a condition, not creating it.

The new IBA president feels that before money and credit controls are tampered with by lawmakers, we should investigate the entire credit field. Nothing should be done until a commission makes its recommendations.

Similar work has been done by the Aldrich Commission prior to the establishment of the Federal Reserve System before World War I. At least such a study might make it less embarrassing and less dangerous for the FRB which sooner or later will be in hotter water.

Goodby to Tax Cuts

If you haven't already, you can give up any hopes you may have had for cuts in either corporate income or excise taxes.

Congress will go through the motions. Spokesmen for industry have already done so before House committees. But the combination of new defense requirements and expanding social programs are ruling out the prospects for the time being.

The corporate tax rate is scheduled to drop from 52 to 47 pct next April. But the Administration will ask that the cut be postponed, as it has in the past two years.

Excise tax rates scheduled to drop next year (autos from 10 to 7 pct and auto parts from 8 to 5 pct, for example) would cost the government $800 million, Treasury Dept. officials say. Experts are now drafting budgets, so a final decision will not be made for some time. But increased expenditures put any possibility into the future—again.

This Apex "2-in-1" spring-loaded impact socket is used interchangeably to run down ¾" and ⅞" hex nuts on automobile engines. It eliminates constant changing of tools, helps step up production. As an additional feature, socket may be turned end for end to double working life.

This Apex Spanner-type socket has four internal driving lugs to engage the four openings in the flange-type nut. It eliminates the customary external prongs that frequently break off and slow down assembly operations. Socket seats nuts quickly and easily in a difficult location inside an automatic washer.

For True Tool Costs, look beyond the price tag!

The true cost of any tool will show up in production records, not just on the price tag. The amount of work a tool can do efficiently is far more important than the original tool cost.

For example, each of these special Apex sockets was designed to solve an unusual fastening problem. For this reason alone, these tools have proved well worth their original price. In addition, these tools have provided substantial savings in production time and expense—that's why the true cost of Apex tools is always lower.

When your production or maintenance work involves nut running or screwdriving, you can keep costs down with Apex tools. There are more than 7,500 stock types and sizes of Apex tools for every nut running or screwdriving job. And, if yours should be a special fastening problem, we'll work with you to develop a special tool exactly suited to your needs.

Apex—the authority on fastening—offers creative engineering and specialized manufacturing experience that will help solve your fastening problem. Our new Pocket Catalog is ready—may we send you a copy?

Ask **APEX** *for the answer to your fastening problem!*

THE APEX MACHINE & TOOL COMPANY

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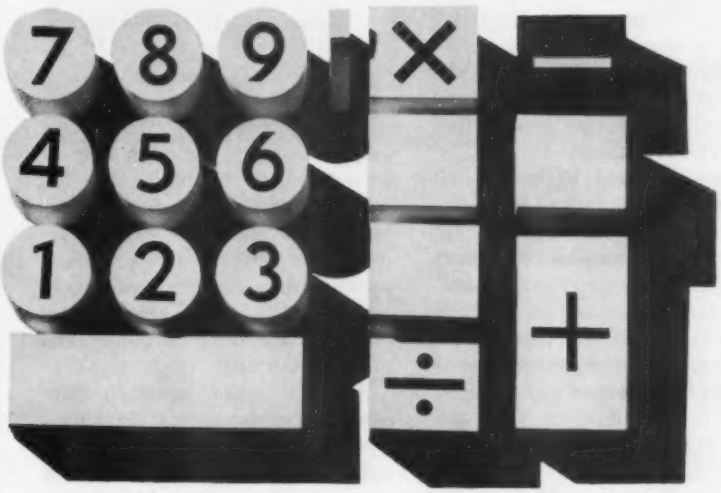
THE IRON AGE SURVEY REPORT TO MANAGEMENT

No. 3 of a Series



HOW TO FIGURE EXECUTIVE PAY

Executive Turnover is at an all-time high. Times are good, jobs are plentiful and executives are in demand. How to attract and hold management talent has become a major problem. One way is through an up-to-date compensation program. This report gives you industry's latest thinking on how to pay executives.

In This Feature

New figures on top management pay through thousands of American Management Assoc. survey reports. Going prices for middle management and engineers . . . What companies are doing about pension and bonus plans . . . The pros and cons of incentive compensation . . . What's wrong with salary programs . . . Where bonuses stop paying off.

How To Figure Executive Pay

◆ **GOOD MEN are always hard to find. But holding on to them is getting even tougher.**

The top executive looking for more "pluses"—the middle-management man caught between rising salaries below and lacking the "fringes" above—the experienced engineer bewildered by the inducements offered beginners—all add up to a high rate of executive turnover.

Barring an economic catastrophe it isn't likely to change soon.

Postwar expansion has a good deal to do with it. Since World War II four times as many executive jobs have opened up compared to pre-war. And when jobs are easier to get turnover is bound to go up.

The low birth rate of the thirties is cutting into the ranks of future management material. Add to this the prospects of an even greater economic expansion due to the bumper crop of war babies —and you get some idea of what companies face in attracting and holding management talent.

Hand-in-hand with the turnover problem goes that of adequate executive compensation. It's not the only reason for the high rate of executive job hopping. But it's certainly one of the most important.

How to pay executives enough to encourage and reward incentive and still satisfy stockholders is a task few firms have mastered to their complete satisfaction.

Surveys by the American Management Association's Executive Compensation Service shed much light on the subject. How much executives are paid, and in what form; the relationship between executive pay and industry, company size, sales, and profits—are some of the important findings.

Recent executive pay trends based on AMA surveys are shown here for top management, middle management and engineers.

Most effective executive compensation programs are based on common fundamentals. Let's look at some of the elements which go into a sound compensation program:

TOP MANAGEMENT

Pay Rises With Business Tide

◆ **TOP MANAGEMENT pay rides with the tides of economic fortune. More than any other executive group, their pay depends on how well their companies do.**

Last year the tide was up. Total executive compensation went up 5.9 pct, according to AMA's seventh annual survey of executive compensation. This includes salaries, bonuses, and contributions to retirement funds.

Pay figures were drawn for more than 28,000 top-ranking executives from 3,300 American and Canadian firms. The survey period essentially covers the calendar year 1955. But it does include some fiscal years that end up to June of this year.

More than anything else the 5.9-pct pay boost reflects a return to more normal salaries and higher bonus payments. It also shows how closely management pay follows business conditions.

During 1954 when nationwide sales declined 2 pct and profits rose only moderately, executive pay went up only 1.8 pct. Last year sales topped 1954 by 10 pct and profits by 25 pct. Top management pay went up with them, but not by as much.

No Uniform Pattern

The pattern was not the same for all industries. Nor did all companies within industry groups follow uniform trends. Both increases and decreases in sales and profits were reported for all types of companies. But the increases outnumbered the decreases by better than four to one.

This had an important bearing on compensation trends, resulting in small decreases in several industries to highs of 9 to 11 pct in others.

Better business last year was also reflected in the compensation of individual executives. In this latest survey about 48 pct of top executives received higher base salaries compared with 38 pct in the previous one.

The bonus part of total compensation, which ran about 16 pct overall, didn't change much as a percentage of base pay. But the number of executives sharing in bonus plans went up. Also, contributions to retirement plans advanced a little over 3 pct; showing the growth and liberalization of these programs.

Economic trends are not the only factor influencing executive

1. A good plan stimulates the management team to increase company efficiency through suitable incentives.

2. Stockholders accept it because it provides the incentive to increased growth and profits.

3. It is reasonable in the eyes of junior executives and other employees; and acts as an incentive for those striving for executive ranks.

4. It complies with the regulations of the Bureau of Internal Revenue.

But no worthwhile executive pay plan can get off the ground until the company clearly defines its attitude toward compensation and what it wants the plan to do.

Pay Policies Differ

All firms want to hold and attract good men.

For some this means paying salaries on par with their competitors. For others it calls for slightly higher salaries to assure an enthusiastic, enterprising management group.

Still a third group might hold salaries down and buttress them with liberal bonus pay to take care of employees in good years and reduce fixed expenses in lean ones.

Whatever pay policies are, they should be fully explained. Every executive wants to know where he fits into a plan, how his job relates to others and where his best opportunities lie.

Once basic policies are decided, the amounts and methods of executive pay can be worked out. Management compensation generally falls into three classes: salaries, incentive or bonus plans and supplementary compensation.

Salaries

Management has done a fairly good job in putting price tags on salaries.

AMA surveys of top and middle management jobs show that 75 pct of the salaries fell within a

---

pay. Added to this, the report points out, individual company needs, growth and financial condition all have their effect on executive pay.

This survey of top management jobs is the most comprehensive to date. It covers the pay of 62 positions in more than 50 industry groups. Most of the groups are broken down into five or more size-classes based on sales.

The table below shows the range of top management pay for eight metalworking industries. Here again, compensation for the first four executive officers in each industry includes salary, bonus and retirement funds.

The figures reported represent the middle 50 pct range of executive pay in these industries—and illustrates the relationships of executive pay to size, industry, sales, and other factors.

In Thousands of Dollars	Chief Officer		2nd Officer		3rd Officer		4th Officer	
	Low	High	Low	High	Low	High	Low	High
Auto parts and equip.	60	125	45	90	40	75	35	60
Fab. metal products	45	110	40	95	30	65	30	55
Heavy machinery	45	105	35	80	30	65	30	60
Instruments	45	95	35	75	25	55	25	55
Iron and steel found.	45	105	35	75	25	55	25	60
Iron and steel prod.	55	115	45	85	40	75	35	75
Light machinery	40	95	35	75	25	60	30	60
Non-ferrous metals	55	120	45	95	35	70	30	60

range having a maximum no more than 50 pct of the minimum. Considering the wide range of industries covered and differences in size, sales and profits this is remarkably close.

Despite this, there is a danger in becoming complacent about salaries. Salary patterns are constantly changing. And while the overall company pattern might be good, inequities in a few positions can seriously damage morale. Without up-to-date facts, out of line salaries might not come to light until it's too late.

But how to get the facts about salaries?

There are a number of ways. Hiring the services of professionals in the field is one. Or a company can make its own survey of other companies in the area. Want ads in newspapers are another good clue as well as the asking price of executive job seekers.

There are both external and internal pitfalls to watch for in setting salary levels.

Extreme highs and lows turned up in salary surveys should be discarded. Best comparisons are with important local companies, particularly chief competitors.

Salaries for different positions must not only be competitive but also reflect the responsibility and difficulty of the work performed. Internal salary inequities cause more serious dissatisfaction than unequal pay scales between companies.

Salary Incentives

Salary programs offer the greatest incentive when employees can increase their earnings as their ability improves. This is done by fixing high and low rates for each position. Incentive is boosted even further when earnings can increase through promotions.

Salary schedules studied by the AMA Executive Compensation Service show that many companies are missing a bet by not building enough incentive into salary programs.

Many times the spread between maximum and minimum pay in the same job is not enough to call for extra effort. For lower level salaries a spread of 20 to 30 pct may be enough. Here the route to higher earnings lies through promotions.

But at the middle and top management levels a man is expected to stay put for a number of years. If the spread is too narrow, the executive's value may increase way out of proportion to his salary.

To remedy this some companies put a spread of 40 pct at the beginning of the so-called "exempt" level and go as high as 100 pct at the top.

Another failure of some salary programs is the small pay gap between one job and other. A 10-pct differential at the $8000 to $10,000 level is considered adequate, with the gap widening as the grades go up. AMA surveys

MIDDLE MANAGEMENT

The Ceiling's Getting Higher

◆ **MIDDLE MANAGEMENT has been described as caught between a low ceiling and a rising floor. Last year middle management pay moved up proportionately with the ceiling.**

Pay increases averaged 5 pct over the previous year, according to the most recent AMA survey of this group. The average middle management executive was paid $11,347. Thirty-five percent of all increases were merit raises ranging from 5 to 9 pct of total salary.

Middle management is also as likely to receive extra compensation in the form of bonuses as top management. Bonuses were paid to 47.8 pct of 20,000 executives in the 33 industries covered by the survey.

In small companies middle management salaries usually range from $5,000 to $14,000 a year. Salaries in larger firms go as high as $30,000.

What Sets Ceilings

The ceiling on middle management jobs seems to be based on company sales and profits. The floor by legislation and union contracts.

Other factors related to specific jobs also affect middle management salaries.

For example a plant manager's compensation might vary with productive volume. Or a labor relations man's pay may partly depend on the number of union contracts he negotiates.

Individuals whose jobs were studied hold 43 different key positions in marketing, manufacturing, purchasing, engineering and industrial relations. On the average, marketing and manufacturing executives did better.

Some interesting figures on executive turnover were turned up in the survey. About 7.5 pct of the executives included in the reports changed jobs last year. Also, some 2.2 pct of the positions covered were eliminated entirely.

The figures on middle manage-

show the spread between company presidents and the next in line runs about 30 to 35 pct.

How is an effective salary program set up?

In small companies the personal knowledge of the president may be enough to handle it. Where up to 50 or more jobs are involved the talents of a group of officers may be needed to classify executive positions and set pay scales. For larger firms some formal plan of evaluation is almost a must.

But no matter who does it and how it is done, salaries are the first and foremost element in executive pay. They are the base for all other forms of executive compensation.

Incentive Plans

For many executives it's the "fringes" which may tip the scales in favor of one company over another. It's not unusual these days for a good executive to take a job at a lower salary because the other benefits more than make up for the loss.

Bonus plans have both good and bad points.

Some companies figure if salary levels are high enough they provide an incentive in themselves.

Others feel that a good salary program coupled with an incentive bonus plan will more than offset the additional cost.

Bonus plans must be seriously taken into account if only because so many companies have them for competitive reasons.

Bonus problems

In an AMA survey of over 3,300 firms about 49 pct had a bonus plan of one kind or another. By dropping insurance firms, banks and utilities—where bonus plans are rare—the proportion goes up to 56 pct.

The biggest problem in setting up a bonus plan is deciding who is to get how much. At first bonuses were paid to only a few top officers. As companies grew, so did the number of participants and the payments.

Current surveys show only about 20 per cent of the plans restricted to top officers. About 40 pct cover supervisory people down to and including the foremen.

About a third of these plans are pure bonus arrangements. Once a

---

ment compensation in the table are for the middle 50 pct of the ranges reported. Since middle management covers such a wide area of responsibility it has been broken down into three groups:

Group I—Includes a.) positions of limited scope and responsibility in larger companies; b.) moderately broad scope and responsibility in medium-sized firms; and c.) positions of broadest scope in smaller firms.

Group II—Includes a.) positions of moderately broad scope in larger companies; b.) positions of broadest scope and responsibility in medium-sized companies.

Group III—Includes positions of broadest scope and responsibility in larger companies.

In Dollars	Group I		Group II		Group III	
	Low	High	Low	High	Low	High
Manufacturing	6,700	10,000	8,000	14,600	13,600	22,400
Marketing	8,300	14,000	11,200	16,800	14,000	23,000
Financial	7,300	11,000	8,500	14,000	12,800	20,600
Ind. Relations	6,700	10,400	7,800	12,000	10,200	18,000
Res. and Engineering	7,700	12,000	9,000	13,600	11,500	19,200
Purchasing	5,600	8,900	7,300	10,700	9,000	13,500

year the management sets aside a certain amount of bonus money and a committee cuts up the pie into pieces of various size.

If the bonuses are large enough and executives feel they were given out fairly, this type of plan will provide an effective incentive.

Another type of bonus called a semi-discretionary plan offers even further incentive. These are based on various profit formulas —such as a set-aside of 10 pct of profits after a 6 pct return on invested capital.

The big difference here is that executives are expected to boost their performance if they know their bonuses go up or down with profits.

As with salary programs, one problem with bonus plans is the difficulty in weighing individual efforts against the needs of the group.

There's always the chance that outstanding contributions to the company might not be recognized. On the other side is the possibility of bias or favoritism creeping into the plan.

Favoritism can be reduced by prorating bonus payments on the basis of salary. But working against this is the fact that salaries in themselves are not enough to reflect output. An executive won't work as hard as he will if he knows his performance is being taken into account.

Split Bonus Funds

To remedy this some companies are splitting the bonus fund from 40 to 60 pct on prorated salaries and the rest on individual performance.

There are limits beyond which bonus plans don't pay off. Most plans in use for a number of years reveal that bonuses below 10 pct and above 50 pct are not likely to promote extra effort. Many newer plans, therefore, restrict incentive bonus payments to 10 to 50 pct of base salary.

A great deal of caution must be used in administering bonus plans. There's always the danger that an executive will become too dependent on them—run into hard times when the bonus fund is low or nonexistent.

Profit sharing plans in which executives participate, although widely praised by those that have them, are spreading rather slowly.

ENGINEERS

Big Gains In A Tight Market

◆ ENGINEERS' pay went up at a higher rate than any other group surveyed by the AMA this year. The national shortage of engineers has undoubtedly quickened this job market. And chances are it's not likely to end soon.

Earnings of engineers and other professional employees increased 8.6 pct from May 1955 to May 1956. This compares with an average increase of 4.5 pct for the previous year. It's a big jump. But one look at the want ads in any of the Sunday newspapers will tell you why.

Engineers with less than a year's experience are earning $5,300 a year — regardless of specialty. The next higher category, with one to three years service, has a median salary of $6,500.

This new study is the largest and most comprehensive of its kind. It covers more than 31,400 engineers, scientists and administrative employees in 49 different jobs and at five levels of responsibility.

Jobs Cover Wide Range

Most of the jobs studied are technical or highly specialized. They range from machine and tool designers in mechanical engineering to ceramic engineers with C.E. degrees. Also included are the newer activities in aeronautical, electronic and nuclear engineering.

Highest salaries reported are for nonmanagement specialists in research and development with some administrative duties. Earnings here go as high as $19,000 a year.

Physicists and mathematicians with similar duties are not far behind with average salaries up to $15,000 per year.

In the top ranges of the technical group pay levels tend to overlap middle management — those between top policy making man-

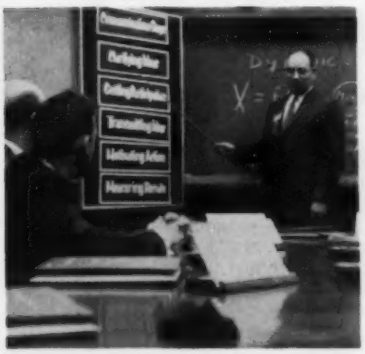
Not more than 14 pct of AMA survey companies have them.

Supplementary pay

Probably the fastest growing area of executive pay since the war is supplementary compensation. These "extras" range over retirement plans, deferred compensation, stock option and purchase plans, insurance programs and a myriad of varying devices to persuade the executive to stay put—or "come hither."

But no matter what they're called, they still come under the heading of executive pay.

Retirement plans are the most popular. More than 60 pct of the firms in AMA surveys have them. And they're growing more rapidly every day.



Few firms look on them as a spur to immediate, topnotch effort. Their big asset is in imparting a sense of security and improving morale generally. Like incentive bonus plans they are a hefty tool in the battle of executive turnover.

Retirement plans fall into two classes—fixed pension plans (contributory and noncontributory) and profit-sharing retirement programs.

Whatever the form, they are regarded as second only to salary as part of a complete compensation program. A good, competitive retirement program today offers 50 pct of final salary.

Deferred compensation is an offshoot of incentive bonus plans, with payments distributed over a number of years. They have their advantage both to the company and the individual. For the company they are, in a way, holding devices, since the unpaid compensation must be "earned out." For the executive they lighten the tax load by spreading income over a

How Young Executives Look At Incentive Plans

◆ A MOST important human aspect is the effect upon younger executives of any incentive plan. The young man in the lower tax brackets wants his now—and in cash. This conflicts with the preference of the older man in higher brackets for some kind of deferred plan —and they are both right in their attitude.

So, a program that meets the needs of both has much to recommend it. Junior executives generally aren't resentful of such tax-dodging gimmicks as company-owned automobiles and boats, club memberships and lavish expense allowances.

However, such practices set an example of the use of the company's money that can develop careless and dangerous "after taxes" thinking—overlooking that in order to have a 50-cent dollar after taxes, the whole dollar must be earned before taxes.—This attitude can be very harmful at every level in management.

WALTER J. SEMLOW, President, Barrington Associates, Inc.

agement and first line supervisors.

However, they are less likely to receive bonuses. Less than a fourth received them—compared with about 50 pct in the middle management group.

Engineers salaries in the accompanying table are broken down into four different specialties and three job levels. Ranges given are for the middle fifty pct of each category.

The three levels are broken down as follows:

Group I—Lowest or starting professional engineering level where experience requirements are negligible and scope of work and responsibility is relatively limited.

Group II—Requires several years of experience. Responsibility is moderately broad.

Group III—Calls for extensive professional engineering experience and skill. Some administrative ability is necessary.

In Dollars	Group I		Group II		Group III	
	Low	High	Low	High	Low	High
Mechanical	4,600	6,300	6,400	9,100	9,300	14,000
Electrical	4,700	6,400	6,500	9,600	9,500	15,500
Chemical	4,800	6,500	6,300	9,600	9,400	15,900
Industrial	4,400	5,900	5,600	8,200	8,500	12,300

fairly long period of time.

Stock bonus plans are like other bonus plans but with stock as payment instead of money. Here again, they have certain advantages for both company and executive. They do not form a drain on working capital. In privately-owned companies they may be the only way an executive can obtain stock in the company.

Group life and health insurance, strong incentives for some, deserve at least passing mention in the framework of executive pay. Again, while their effect is not immediate, they do enhance long-range performance and morale.

No single executive compensation program can meet the needs of all companies. Each firm must tailor its own to fit its particular needs and capabilities.

But from the experiences of many companies certain broad conclusions can be drawn:

1. No incentive system can substitute for good management.

2. Salary standards should be designed with their incentive value in mind.

3. Incentive plans must be closely related to individual performance as much as possible and at the same time produce the most benefits for the group.

4. For best results incentives should be clearly explained to participants.

5. Flexibility must be built in to take care of external conditions and varying company needs.

ACKNOWLEDGMENT

The editors want to thank Dean H. Rosensteel, Director of the AMA Executive Compensation Service, for his help in preparing this feature and for permission to publish the tables on pp. 99, 101 and 103.

PHOTO CREDITS:

Executives shown on these pages were photographed by the AMA at various association meetings.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*

Executive Pay: A Problem in Balance

◆ **RECENTLY a purchasing executive passed up one job with an annual salary of $18,000 for another at $16,000. Reason: In toto, the $16,000 job paid better.**

To those familiar with overall trends in executive compensation this is not so contradictory as it might appear, for salary—though still the most important factor in executive income—is by no means the only one. Many forms of compensation—such as bonuses, incentives, stock option plans, as well as direct forms of compensation as retirement, and other "fringe" benefits have come into use.

As a result, those responsible for administrative executive compensations programs are today faced with many problems other than those of keeping salaries competitive at the same time maintaining an equitable internal structure.

For example, what proportion of an executive's total compensation should be in the form of base salary, and how should the balance be distributed among the various alternative types of supplementary or extra salary compensation? In the latter category, what are the special advantages of one type of plan as against another, and what is the ideal "mix" or balance where compensation takes forms other than base salary?

DEAN H. ROSENSTEEL, Director, AMA Executive Compensation Service in The Management Review

Pros and Cons of Incentive Plans

ADVANTAGES:

1. Payments directly related to performance provide an important incentive for more individual effort.

2. Based on company, division or branch results they promote teamwork.

3. They instill a sense of ownership and corresponding interest.

4. They contribute to high morale and effective management.

5. Fixed charges can be kept low and adjustments made faster as conditions change.

6. Stockholders reap the benefits of greater management incentive through higher returns on investment.

DISADVANTAGES:

1. It is hard to measure individual performance.

2. Plans become automatic and lose incentive value after a number of years.

3. They are difficult to administer fairly.

4. Stockholder and public reaction has at times been critical of incentive payments.

5. Incentives can't be paid during low-profit periods when executives must exert their greatest efforts.

6. Executives are tempted to work for short-term gains and neglect the long-range interests of the company.

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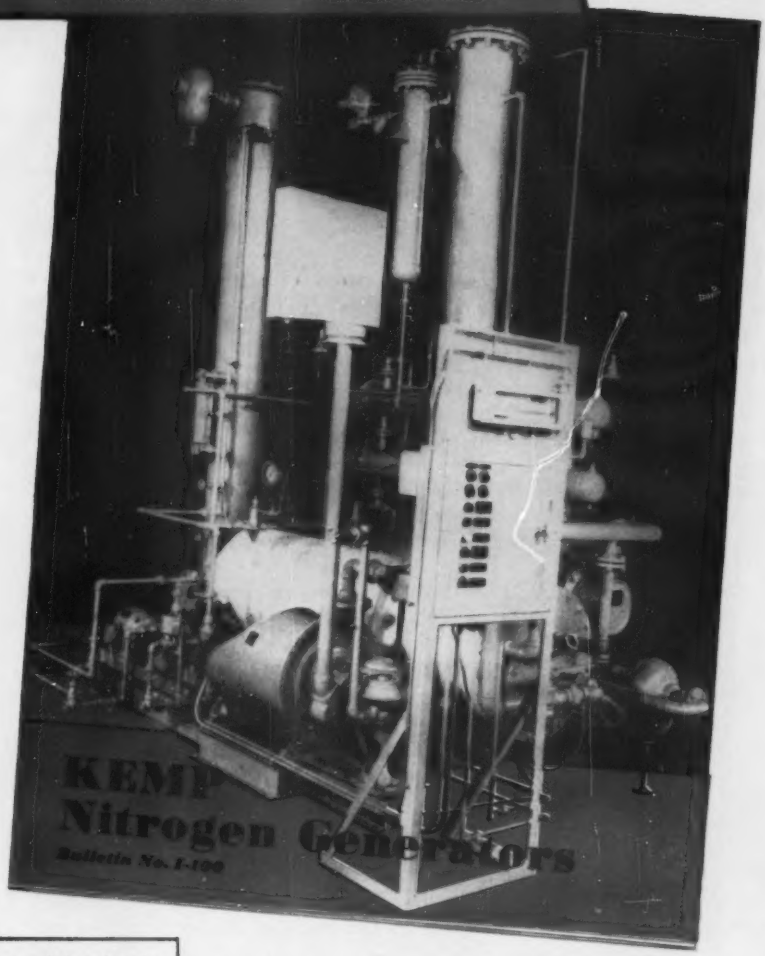

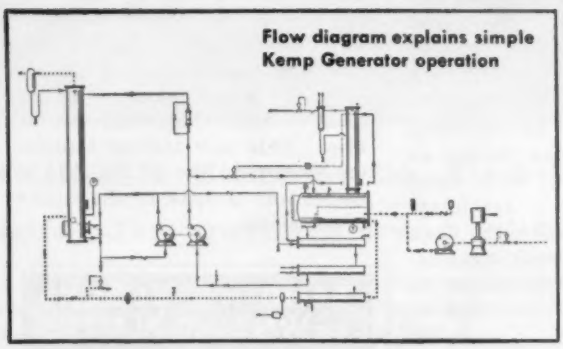

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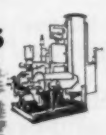

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INDUSTRIAL BRIEFS

Small Change . . . The Small Business Administration has revised its definition of small business for government procurement. Some firms with fewer than 500 employes are classified as large, while others with more than 500 may be classified as small.

The revised definition modifies the old arbitrary rule that all firms with 500 or more employes are large. Now a business with fewer than 500 employes cannot be considered small if it is dominant in its field.

Millions For Defense . . . A contract in excess of $2 million for production of an improved airborne electronic countermeasure system has been awarded by the Navy Dept., Bureau of Aeronautics, to the W. L. Maxson Corp., New York.

Poison Not Deadly . . . Calumet & Hecla, Inc., has discovered a substantial body of uranium ore about 18 miles northeast of Grants, N. Mex. The discovery in the Poison Canyon sandstone is located at an average depth of 180 ft below the surface. Current drilling operations continue to add to ore reserves.

Fast Thinking . . . A new $8 million device designed to permit a single flight test to give results which now require several flights will be put into operation at Holloman Air Force base, Paris, France, in 1958. General Electric, makers of the device, report that it "thinks" faster than a guided missile.

Double-Jointed Deal . . . Two leading manufacturers of flexible tubing are joining forces to make a more extensive single line of flexible hose and fittings. Flexonics Corp., Maywood, Ill., has acquired the Flex-O-Tube Div. of Meridan Corp., Inkster, Mich.

United They Stand . . . Four of its railroad divisions will be united by American Brake Shoe Co., effective Jan. 1, 1957, in a newly created Railroad Products Div. Headquarters will be in New York. The new division includes railroad product facilities of the present Brake Shoe & Castings Div., the National Bearing Div., the Ramapo Ajax Div., and the Southern Wheel Div.

Can Do . . . The American Can Co. has undertaken a broad program of overseas manufacturing and expansion of its export sales of containers made by the company in the U. S. The program includes the organization of Metalgrafica Canco, S. A., a can-making company with a manufacturing plant at Sao Paulo, Brazil.

Sooner And Bigger . . . Jones & Laughlin Supply Div., has dedicated its $1.7 million headquarters building and supply store at Tulsa, Okla. Adm. Ben Moreell, chairman of the board of the parent organization, officially opened the building by cutting a strand of J&L wire rope.

Paper Switch . . . United States Steel Homes, Inc., has become an operating division of U. S. Steel Corp. rather than a subsidiary company. The division has been part of the U. S. Steel organization since 1944, with plants in New Albany, Ind., and Harrisburg, Pa.

Roll That Coal . . . A conveyor belt has been placed in operation over Western Kentucky's rugged hills by the DeKoven Mine of Pittsburgh and Midway Coal Mining Co. to haul coal to the Ohio River. The belt conveyor system moves coal two and one-half miles, roller coaster style, over heavily-wooded hills at a rate of 900 tons an hour to barges on the river.

Plan Handling? . . . A complete application engineering service aimed at reducing materials handling costs is now being offered by Lewis-Shepard Products, Inc., Watertown, Mass., producer of electric fork trucks and related materials handling equipment. The plan is designed for companies that seek a precise analysis of their present materials handling methods.

Millions for Research . . . Research volume soared to a new record at Armour Research Foundation of Illinois Institute of Technology during its 1955-56 year. The foundation's gross volume totaled $11.9 million, about $1 million more than the previous year. A record 691 programs were conducted during the year—393 projects were for industry and 298 for government.

Less Fusion Confusion . . . The S. G. Taylor Chain Co., Inc., Hammond, Ind., has been authorized by the Atomic Energy Commission to use Gamma Ray for quality control. Gamma Ray is used by Taylor on master, joiner, and end links of alloy sling chain assemblies. This new testing supplies an X-ray-type film of the weld to detect any defects in the fusion of the metal.

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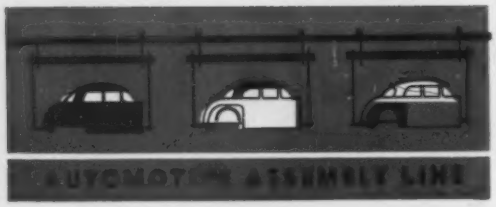

Big Changes Coming In Car Styling

Designers will have to cater to a more sophisticated public, within engineering limitations . . . Three types of vehicles to dominate future markets . . . More glass, sculptured metals use seen—By *T. L. Carry.*

◆ THE DESIGN of future automobiles, although not unlimited, holds great promise as far as improvements are concerned.

In recent years, the automobile stylist has come into his own. The public is more aware of how an automobile looks, and taste in automobiles is growing more and more refined.

Because of this factor, it's possible that in the future many ideas that were considered highbrow or impossible will gain acceptance and cars will be greatly improved in appearance.

Three Car Garage . . . At the same time, changes in living habits will see the development of three distinct types of vehicles, according to Edmund E. Anderson, director of styling at American Motors Corp.

Mr. Anderson says that the three types of vehicles that will dominate tomorrow's market are the small, personal car, the compact auto and the large limousine for traveling long distances.

He bases his predictions on three factors. Suburban living will create the need for a small personal car—one that will permit ease of handling and parking. Secondly, the standard of living will steadily increase and there will be a larger number of families owning two and even three cars. The mark of distinction in the future will not be the size of an automobile but how many you have in your garage.

Style Has Limits . . . Improvements in modern living and the growth of super highways will create the need for the large type of limousine for traveling long distances between cities.

What are these cars going to look like?

Automobile stylists are always limited by other factors. They have to design a car that has eye appeal and at the same time incorporates other factors such as safety and performance at a reasonable price. They are also limited by manufacturing processes. As these improve over the years, likewise the design of the automobile will keep pace.

As far as the immediate future is concerned, a panel of experts at the New York automobile show agreed that there will be an increasing trend toward the use of sculptured metals.

At the same time, the demand for more horsepower in a smaller vehicle will see wider adoption of such light metals as aluminum, magnesium and titanium.

Radical Changes Coming . . . Lower cars will create the need for doors that swing into the roof to make it easier to enter and leave the vehicle. Eventually, the industry is likely to adopt a swivel-type of bucket seat, already in evidence on some dream cars. Also, it is not unlikely that at some time in the near future telescoping steering columns will be a standard feature.

Increases in the use of glass in a car will lead eventually to glass that not only wraps around the car but also goes into the roof.

Most of these things are likely to be adopted within the next 10 to 15 years.

In the far distant future stylists

What Your Future Family May Be Driving

FIREBIRD II, described by General Motors Corp. as "the family car of the future," is powered by a gas turbine engine and has an all-titanium body. Harley J. Earl, GM vice president and designer of the car, examines it.

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(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
DEC. 8, 1956	180,988	26,230
DEC. 1, 1956	169,381	27,190
DEC. 10, 1955	184,131	28,730
DEC. 3, 1955	184,336	29,170
TO DATE 1956	5,740,043	1,143,826
TO DATE 1955	7,877,795	1,259,922

*Estimated. Source: *Ward's Reports*

can picture a large limousine with electronic devices that will guide and stop the car. Such an automobile would reduce greatly the possibility of error and be a real boon to automobile safety.

It's possible that the dream car of the future may not even need an engine, according to William Schmidt, Studebaker-Packard director of styling. Mr. Schmidt predicts that someday there may be a car that is atomically controlled.

Advertising:

New GM setup may have far-flung repercussions.

Industry observers are watching closely for any competitive reaction to General Motors' latest change in its dealer advertising program.

Under the new setup, the corporation will no longer charge dealers for any part of its advertising. Previously, GM dealers were assessed a given amount for each car sold.

The immediate effect, as far as GM itself is concerned, will be an increase in the price of cars to offset the loss in revenue from the dealers. Chevrolet has already upped its prices and other divisions are expected to follow suit shortly.

But the real problem is not the corporation but its competitors. It is not known at this point whether other members of the Big Three are likely to follow GM's example.

It is apparent that Chrysler and Ford will have to do something to keep their dealers happy. And the two independent companies may also have to follow suit. In actual dollars, the move won't make any difference to producers.

Some dealers claim that they have been absorbing the advertising cost for years. This may or may not be true. However, prices of new cars have already reached a critical point.

Additional increases, such as Chevrolet's, could well have the effect of dampening the public's enthusiasm for a new car.

Rambler:

What's behind the new fuel injection?

Veteran Detroit automen are questioning the wisdom of American Motors Corp. in offering a fuel injection system as optional equipment for a new Rambler model called the Rebel.

The new model comes with either a standard 4-barrel carburetor which develops 255 hp or with an electronic fuel injection system rated at 288 hp. The fuel injection system, produced by Bendix Corp., is electronically controlled as opposed to the mechanical system developed by General Motors Corp.

AUTOMOTIVE NEWS

It is not fuel injection itself but its use by American Motors that has these people wondering.

For months now George Romney, vigorous young president at AMC, has been insisting that the company's problems were in no way similar to the Big Three.

The company's survival, Mr. Romney says, depends not on meeting the Big Three head on as a full line producer but more on outflanking them by producing a car nobody else has.

American Motors has been hitting the economy angle of sales promotion in a hard fashion. Its coast-to-coast run last year with a 6-cylinder engine for less than 1¢ a mile was considered one of the best industry promotions.

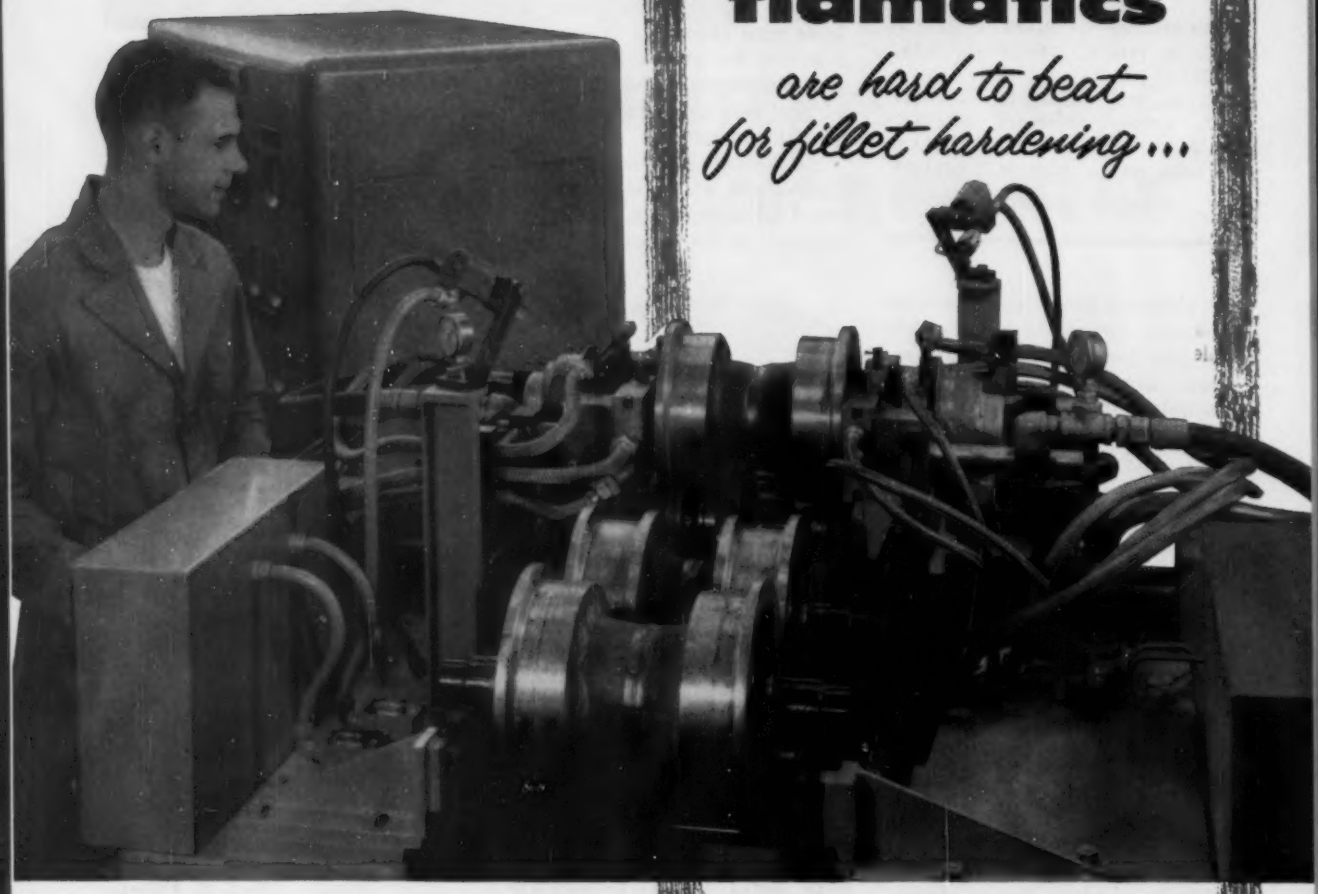
Now, the company seems to be getting away from its philosophy of outflanking the Big Three.

So it appears that with the addition of 4-barrel carburetors and fuel injection, the company is meeting the Big Three head-on at least in the power field.

THE BULL OF THE WOODS By J. R. Williams

flamatics

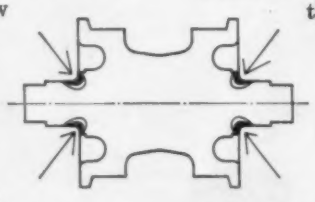
are hard to beat for fillet hardening...



...and for many other selective surface hardening applications

Above you see a new, fully automated Cincinnati® Flamatic being used to increase strength and fatigue resistance of the axle fillet sections of 120 lb., SAE 1045 steel track rollers for crawler-type vehicles. Here's how it operates in the plant of a major manufacturer of heavy construction equipment:

Track rollers are delivered, one at a time, from the loading rack to the heating station. As the flame heads "scissor in," the part is rotated rapidly and an oxy-propane flame is applied to both axle fillet sections for 64 seconds . . . immediately followed by a 24-second spray quench. The part is then released to roll down the discharge trackway, while the next part is received in the fixture.



The operator is required only to initiate the cycle, which will continue automatically, as long as parts are on the receiving conveyor.

A case, ⅛" thick, hardened to Rc 55-53, is produced around the periphery of the fillet sections, with a wide transition zone behind it. (See part sketch.) Production is 38 parts per hour.

If you have a selective surface hardening problem, it will pay you to talk to Cincinnati. . .*builders of both Flamatic® (flame) and Inductron® (induction) hardening machines.* Discuss your requirements with a Process Machinery Division field engineer. He is ideally equipped to evaluate your needs and give you unbiased recommendations as to the most economical equipment for your work.

CINCINNATI **flamatic**

THE PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

Axe Our Taxes, Asks Small Business

Small firms asking Congress for exclusive tax relief . . . Larger firms argue for overall reduction of both corporate and personal income taxes . . . Expect no excise tax reduction—*By G. H. Baker.*

◆ LOOKS LIKE 1957 is going to be a year of hot and heavy tax action in Washington.

Small firms are due for some favorable "breaks." And talk of a national sales tax will boil up in Congress again. Next year could be the year for writing such a program into law.

Relief for smaller firms will be the big item on the 1957 tax legislation docket. Many larger firms are pooh-poohing the solution suggested by President Eisenhower (reducing the basic rate on $25,000 profits), say it doesn't make enough difference to be worth while. They argue it would be better to trim corporation income tax from 52 pct to 47 pct, and reduce personal income tax to help unincorporated business. Small firms think otherwise, insist on exclusive relief. They may well get it.

Sales Talk . . . Expect a lot of talk but not much action on the sales tax. Congress will be asked to write new excise tax schedules for products not now taxed. And proposals will be made to cut the rates on products like automobiles and automotive parts. But little excise reduction is anticipated.

As long as business is good and sales continue to move briskly, Congress will not be disposed to cut existing excise rates. Only a serious recession, not now in the cards, could move Congress to slash rates, as a sales stimulant.

Paper Savings

Industry-government committee, seeking ways to ease the load of paperwork imposed on metalworking firms, has hit pay dirt. By persuading Census Bureau and Business & Defense Services Administration of the U.S. Commerce Department to pool some of their statistical data, metalworking firms will save $3.7 million a year in clerical costs.

Up to now, shipments of prime scrap—steel, copper, and aluminum—had to be reported separately to the Census Bureau and BDSA. The industry-government committee did some sharp talking and finally convinced them to pool their data.

There are plenty of other instances in Washington of this same sort of wasteful duplication. Government agencies are notoriously reluctant to share their data with other agencies for fear of eroding the prestige of their own "empires."

THE IRON AGE

"If you want anything see him. I hear he's got a terrific 'in' with the President!"

Seek Simplicity

Next government agency to feel the hot breath of efficiency experts is the Federal Communications Commission. FCC, according to complaints from industrial and commercial broadcasters, demands literally hundreds of forms on different subjects. Many of these duplicate each other. Some repeat information requested by other government agencies. Some regulations even contradict each other.

An industry-government committee plans to sit down with FCC and boil the fat out of the complicated reporting system.

TV Or Not TV

Two conflicting interpretations of the Taft-Hartley Act's ban on the use of general union funds for political purposes are being studied by the U. S. Supreme Court.

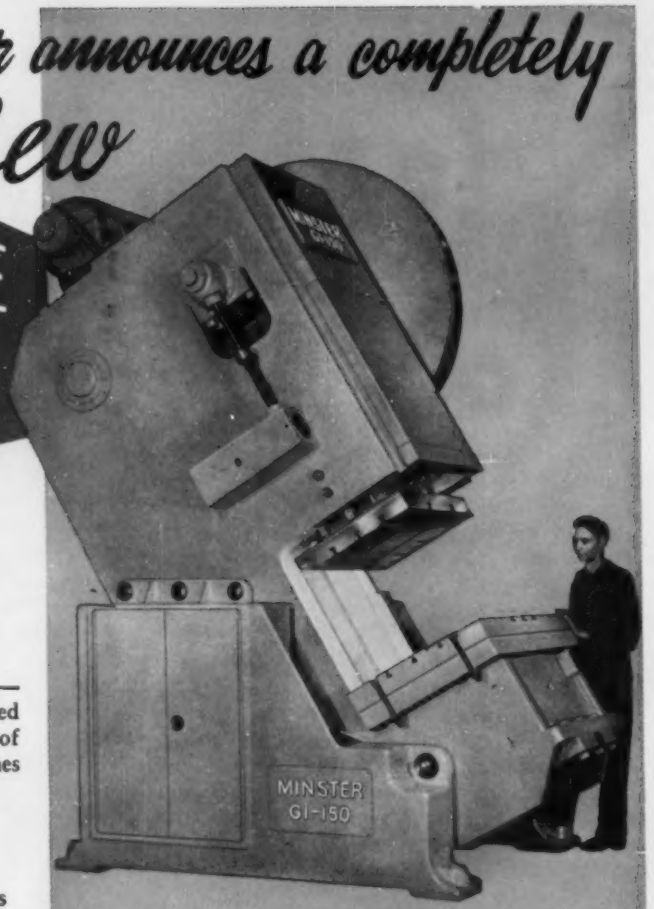
Opposed views come from the U. S. Justice Dept., and the United Auto Workers.

Justice Dept. contends that the auto workers violated the T-H law by using its funds for four telecasts in favor of the Democrats in Detroit in the 1954 Congressional campaign. The union insists the law does not include TV electioneering.

A Federal Court at Detroit recently dismissed an indictment against the union. Decision is based on the precedent which said the law did not cover a union newspaper editorial by a union official supporting one particular candidate.

Minster announces a completely New

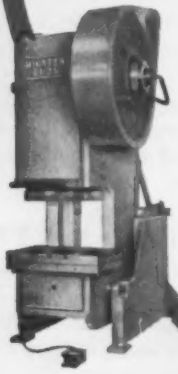
STEEL FRAME GAP PRESS



SERIES G1 PRESSES

Patents Pending

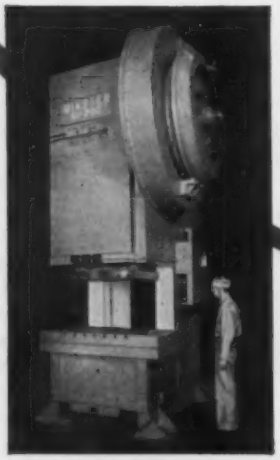
Today's most rigid and efficient gap presses—G1 Steel Frames, are engineered and fabricated with a completely new approach to the problem of achieving minimum deflection in steel "C" frames for gap presses.



CAPACITIES OF
75, 110, 150 and 200 Tons

- Fixed Base or Inclinable
- Flywheel or Geared Types
- Minster Patented Combination Air Friction Clutch and Brake
- Barrel Slide Adjustment and extremely long Slide Ways
- Power Inclining

Series G1-75 flywheel type inclinable gap press with manual inclining and standard leg.



The 200 ton G1 fixed base geared type gap press—Available with either bed attached or sliding type die cushion.

MINSTER G1-150 ton geared type gap press—Motorized Inclining—Cabinet Legs house all electrical and air controls—Connect Air Line and Plug in power; in seconds, it's ready to operate.

CONDENSED STANDARD SPECIFICATIONS

CAPACITY	STD. STROKE of slide	STROKES per minute	BED AREA	SLIDE AREA
75 tons	4	Flywheel 90 or 120 Geared 40	24 x 36	18 x 24
110 tons	5	Flywheel 80 or 105 Geared 37	27 x 42	21 x 28
150 tons	6	Flywheel 80 or 105 Geared 30	30 x 50	24 x 34
200 tons	8	Geared 28	34 x 58	28 x 96

Build a sound replacement program modernize with Minster Presses

MINSTER®

PRESSES

THE MINSTER MACHINE COMPANY, MINSTER, OHIO

Don't Overlook Portland as Metals Market

Metalworking now outranks lumber as the No. 1 employer in this fast-growing market . . . Wide range of products produced . . . Aluminum reduction plants are big factor . . . Foundries thriving—By *R. R. Kay.*

◆ METALWORKERS selling the West Coast area can't afford to overlook Portland, Ore. It's another fast-growing spot for metalworking products and services.

Metalworking outranks the giant lumber industry as Portland's No. 1 employer. So says the latest Census of Manufactures. In 1954, metalworking's payroll was over $72 million and value added by manufacture hit $140 million. The value added was 31 pct of that of all Portland manufacturing—a 73 pct increase over 1947. And today's figures are even higher.

All Sorts and Sizes . . . Variety is the spice of Portland's metalworking life. The diversification trend, steady for several years, is now very strong. Made-in-Portland labels go on lots of products from mechanics' hand tools to special logging devices, from automobile license plates to furnaces and heating equipment.

Big factor in the area's industrial growth: aluminum reduction plants. Both Aluminum Co. of America and Reynolds Metals Co. jacked up capacity in the past few years. The result is a healthy increase in Portland-area aluminum fabrication.

A Shot in the Arm . . . World War II shipbuilding gave the Portland metalworking industry its big boost. When fighting stopped, subcontractors switched to other products, many never before made in the Pacific Northwest. And some shipbuilders, themselves, branched out.

Take Albina Engine and Machine Works and Gunderson Bros. Eng. Corp., both still in ship construction and repair. Today, Albina also makes a motorized painter's stage. And, through an affiliate, turns out stainless steel valves. Gunderson is readying a new automobile parking unit called "File-A-Way."

Willamette Iron and Steel Co., area's largest shipbuilder, is at work on a multi-million-dollar conversion job. Its Bingham Pump Div. continues to grow, making large centrifugal pumps for the world market.

Humming Along . . . In fact, Portland's metalworking industry is humming on all fronts, expanding, diversifying, or both. Oregon Steel Mills, with three electric furnaces, recently expanded. The firm makes light structurals. Union Carbide & Carbon's Electro Metallurgical Div., a ferroalloy producer, has doubled capacity.

Foundries are thriving. There are 15 gray iron, 20 nonferrous and four diecasting. Leaders include: Electric Steel Foundry Co., high alloy and electric steel castings; and Omark Industries, ferrous investment castings. Schmitt Steel, Inc., is one of three steel forging plants.

Iron Fireman Mfg. Co. has a large plant subcontracting for the aircraft industry.

Claims To Fame . . . Portland is a leading producer of logging trucks, trailers, sawmill and lumber manufacturing machinery. That figures, since woodworking is still Oregon's No. 1 employer.

Lift truck makers include Hyster Co. and Lamson Mobilift Corp. And tractor manufacturing is in for a big boost. Wagner Tractor Co., a Mixermobile Manufacturers affiliate, bought a 71-acre site.

Tapping Computer's Memory is Easier Now

◆ MOVING pick-off heads are able to record information on or read it off the 64 magnetic channels of this memory drum while drum revolves at rate of 1800 rpm. The two pick-off heads—developed by engineers at Northrop Aircraft — are mounted on a transverse carriage which can make a full cycle up and down the face of the drum in approximately two seconds. The unit makes it possible to reduce the pick-off circuitry requirements to about 3 pct of those required were separate heads used for each of the 64 channels.

what's the DIFFERENCE . . .

the DIFFERENCE is . . .

To you, the user or buyer, the most important difference between MARVEL High-Speed-Edge Hack Saw Blades and ordinary blades is the *unequalled* performance you get from MARVEL Blades.

Performance reflected in higher production (faster cutting-off), greater accuracy of cut-off blanks, and longer blade life has made MARVEL the preferred blade in every kind of metal sawing operation.

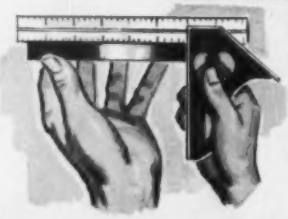
To get the *difference* in performance, always insist on MARVEL High-Speed-Edge Hack Saw Blades. Leading Industrial Distributors have them in stock.

Write for "The MARVEL Story." It has complete details on MARVEL High-Speed-Edge Hack Saw Blades and Hole Saws.

HIGHER PRODUCTION

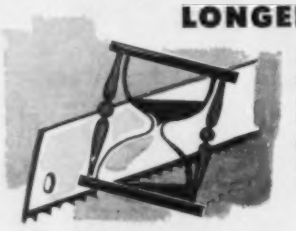
Unbreakable MARVEL High-Speed-Edge Blades can be worked faster and harder than any other blade with complete safety. They will withstand the highest speeds and heaviest feeds attainable on any make hack sawing machine. MARVEL Blades will cut any machineable metal. No wasted time changing blades for different materials.

GREATER ACCURACY



Composite construction permits MARVEL Blades to be tensioned from 200% to 300% more taut than ordinary blades. This produces greater rigidity of the high-speed-steel cutting edge, resulting in maximum obtainable accuracy of cut-off blanks.

LONGER BLADE LIFE



Each MARVEL High-Speed-Edge Hack Saw Blade is triple tempered to assure maximum toughness of the cutting edge. MARVEL Blades not only give you longer life, they assure a *more efficient* cutting life, with resulting lower blade costs.

B-1121

ARMSTRONG-BLUM
MFG. CO.
5700 WEST BLOOMINGDALE AVE. • CHICAGO 39, ILL.

MARVEL *Metal Cutting* SAWS
Better Machines–Better Blades

Straight Line Shortest, But Not Best

MAPI says machine tool buyers can do 10 to 15 pct better on tax depreciation . . . Report offers advice on when to use which—sum of the digits, or double declining balance—By *E. J. Egan, Jr.*

◆ IF YOU BUY new machine tools you should be aware that straight-line tax depreciation is no longer mandatory. Nor is it the best method the 1954 Internal Revenue Code permits.

You can boost after-tax rate of return 10 to 15 pct with either the sum-of-digits or double-declining-balance technique.

Which of the two is best for you? There's no pat answer, but you might find some suggestions in a new report issued by Machinery & Allied Products Institute. It makes a direct comparison between the two methods.

Which is Which . . . The report discusses a hypothetical case in which there is no estimated terminal salvage for the capital goods. Conclusion is that the sum-of-digits method generally yields a slightly higher after-tax return than the declining-balance system. The advantage is reversed, however, when the service life of equipment is five years or less.

Where there is a terminal salvage estimate, plus an asset life above five years, MAPI says you won't go far wrong by sticking to a simple rule: "Use sum-of-digits where the salvage estimate is below 10 pct of cost; use straight double declining-balance where the estimate exceeds 10 pct."

Personal Copy . . . MAPI doesn't set this as a hard-and-fast rule. Your past practice, present set-up of depreciation accounts, number of depreciable assets involved and other factors controls your choice between the two methods.

Single copies of "Capital Goods Review No. 28," are $1.00 at Institute headquarters, 1200 Eighteenth St., N. W., Washington 6, D. C.

Good or Better . . . Cleveland's Warner & Swasey Co. expects its machine tool sales next year to be as good or better than its current high rate. Here is how the firm's district sales managers size up territorial prospects for 1957:

New York, Chicago and Los Angeles—"Excellent prospects for increased buying by the aircraft industry."

Pittsburgh and Philadelphia — "Activity among electrical equipment manufacturers appears promising."

Houston—"New plants moving to the southwest are stimulating sales. Another favorable factor is increased activity by oilfield equipment shops because of the Suez Canal situation."

Milwaukee—"Great activity in manufacturing of both oilfield and electrical equipment. Machine tool builders in area expanding also."

Cleveland, Atlanta, St. Louis, and Davenport, Ia.—"Expect manufacturers of road machinery to account for large share of 1957 business. Plants doing general manufacturing are also high on the prospect list."

Detroit and Dayton—"Many machine tool builders will be good customers as they speed expansion of present facilities."

"Ever since he went to that Power Conference there's been no living with him!"

Billion Worth . . . Shipments of all types of U. S.-built machine tools will total more than $1 billion in 1956, according to estimates of the Metalworking Equipment Div., Business & Defense Services Administration, U. S. Dept. of Commerce.

Metal cutting and grinding machine shipments are expected to be about $788 million; metal forming machines should add about $297 million.

Machine Tool Muster . . . The proposed $38 million military budget for fiscal 1957 seems likely to produce even more machine tool business than had originally been anticipated. Right now an emergency situation would really balloon builder's backlogs. Department of Defense needs for full mobilization output would require at least 100,000 more machine tools of all descriptions than are now on hand in various government inventories.

MicroRold® STAINLESS SHEET

Type 430 Bright Finish

up to 48" WIDE

BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

Washington Steel
Corporation
12-L WOODLAND AVENUE WASHINGTON, PA

The Iron Age

SALUTES

John Gammell . **Director of Allis-Chalmers graduate engineer training program, he draws on 25 years experience as an engineer, executive and salesman to develop newcomers in the field. He holds office in many educational groups.**

It takes one to know one—and John Gammell really knows what makes engineers tick. He understands their likes and their prejudices. He knows how to win them over to his side.

That's a big reason why Allis-Chalmers Manufacturing Co. made him director of its graduate training program, and why he has become one of the best-known personnel executives in the nation.

Choosing Mr. Gammell for the job could have been a tough decision for Allis-Chalmers management. He was a successful sales representative in the firm's Philadelphia office for more than a decade. Before that he was an excellent engineer-estimator in the centrifugal pump and steam turbine department. During World War II years, he served as chief of the War Production Board's electrical equipment branch.

But because the company needed a man with an engineering background, executive ability and the simple virtue of getting along with people as head of its training program, other factors were waived. Why waste a man with those talents in one specialized department?

A native of Burton, Wash., Mr. Gammell was graduated from the University of Washington in 1928 with a degree in electrical engineering. He went straight to Allis-Chalmers in Milwaukee, and was himself a product of the company's graduate training program.

John Gammell is a joiner. He belongs to a dozen or more engineering societies, is treasurer of the American Society for Engineering Education, a director of the Wisconsin Society of Professional Engineers and is a regional chairman of the Guidance Committee Engineering Council for Professional Development.

In these days of acute engineer shortages, Mr. Gammell is doing an important job for his industry. Not only does he search out the best possible talent, he teaches them to become polished engineers.

Lapointe Machine Tool Company, Hudson, Massachusetts

FIRST OF ITS KIND IN THE WORLD!

...And It's Lubricated by Cities Service Pacemaker 400 T Oil!

LAPOINTE MACHINE TOOL COMPANY, originator of the broaching method of cutting metal over 50 years ago, has now originated the first vertical broaching machine with variable speed electro-mechanical drive.

Purpose of the huge, gear-driven machine is to increase tool life up to 500% through smoother operation, thus saving down time and producing more accurate work.

Selection of a lubricant for the new machine was of special importance because of the tremendous pressures it develops: normally 30,000 pounds, sometimes up to 60,000 pounds. Of the many brands of lubricants Lapointe tested, Cities Service Pacemaker 400 T had the necessary requirements for the job . . . so naturally, this superior lubricant got the job.

"We test the machines with Pacemaker 400 T at the factory and then put it in again when the broaches are assembled at the buyer's plant," says Lapointe. "It offers all the characteristics we need: Good film strength, high viscosity index, and exceptional anti-foam and anti-oxidant qualities. Needless to say, we're pleased and impressed with this Cities Service lubricant."

Like scores of others, Lapointe has discovered the search for a proper lubricant ends at the Cities Service label. Altogether, there are hundreds of Cities Service products for the exacting needs of industry. For more information, talk with your nearby Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Quick Facts About New Broaching Machine

USES: Now used for broaching aircraft engine turbine buckets, but can be adapted to general broaching.

ADVANTAGES: Increases tool life 400-500% through smoother operation, less down time. Produces more accurate work. Variable cutting speed: 12 to 75 FPM. Available in single or double ram models with 72" to 100" stroke.

Quick Facts About Pacemaker 400 T Oil

USES: Propulsion turbine units where oil is circulated under heavy pressure. Widely used in naval and commercial vessels, high speed industrial machinery.

ADVANTAGES: High viscosity index, excellent heat resistance and film strength. Chemically fortified against oxidation, rust, and foaming.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

The Iron Age INTRODUCES

C. W. Blount, appointed vice president, marketing, **Bakelite Co.,** Div. of Union Carbide and Carbon Corp.

James P. Haight, elected vice president, engineering and purchasing, **Aluminum Co. of America,** Pittsburgh.

James W. Hutchison, appointed vice president, reduction, **Olin Revere Metals Corp.,** Omal, O.

Don O. Noel, appointed asst. to president, **Metals Disintegrating Co., Inc.,** Elizabeth, N. J.; **Terry M. Kuwashima,** named development engineer.

James J. Dalton, named general superintendent, Cuyahoga Works, American Steel & Wire Div., **U. S. Steel Corp.**

Following men have been appointed acting superintendents, Truscon Steel Div., **Republic Steel Corp.,** Youngstown, O. **Alfred Collier,** structural steel; **Mathias Kutsko,** stainless steel windows; and **James L. Williams,** machine shop.

Philip G. Monteith, appointed asst. to sales manager, Lacledе-Christy Co., Div., **H. K. Porter Co., Inc.,** St. Louis, Mo.

Robert L. Knox and **Herman R. Brown,** named asst. sales manager, **The Frank G. Hough Co.,** Libertyville, Ill.

Willard Dunham and **Henry Steers,** appointed assistant western sales managers, **Russell, Burdsall & Ward Bolt and Nut Co.,** Chicago office.

William F. Tamplin, named asst. manager, sheet and strip sales, **U. S. Steel Corp.**

Charles E. Knox, named manager, Process Engineering and Production Control Dept., The Spring Div., **Crucible Steel Co. of America,** Pittsburgh.

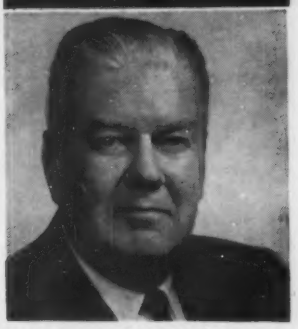
Edmond K. Hatch, named asst. manager, Machine Div., **Osborn Manufacturing Co.; E. Henry Brauer,** named asst. chief engineer, Machine Div.

C. E. Rogers, named metallurgist, **Victor Equipment Co.,** Alloy Rod and Metal Div., Norwalk, Calif.

Donald R. Meckstroth, named manager, marketing, Package Products Dept., **Westinghouse Air Conditioning Div.,** Staunton, Va.; **John A. Gilbreath,** named manager, Air Conditioning Div.

Donald H. Tilson, named manager, northwest operations, **Aluminum Co. of America,** Vancouver, Wash.

Leonard J. Edwards, appointed manager, Furnace and Oven Div., **W. S. Rockwell Co.,** Fairfield, Conn.



WALTER F. MUNFORD, named asst. executive vice president, U. S. Steel Corp., Pittsburgh.

J. D. BENEDITO, elected vice president, sales, Bakelite Co., Div. of Union Carbide and Carbon Corp.

WILLIAM J. REILLY, named general manager, Steel Div., Ford Motor Co.

EARL B. SMITH, named sales manager, Machine Div., Osborn Manufacturing Co.

Following appointments are within the **Central Foundry Div.**, General Motors Corp. **Charles E. Drury,** named plant manager, Danville plant; **Gordon S. White,** named plant manager, Defiance, O.; **Leslie L. Shafer,** named sales manager; **Elmer E. Braun,** named divisional works manager.

Everett A. Sisson, appointed director, sales, **The Patterson Foundry and Machine Co.,** East Liverpool, O.

Raymond A. Simmons, named asst. purchasing agent, **Pratt & Whitney Co., Inc.,** West Hartford, Conn.

Kenneth A. Bradley, named sales representative, Hartford (Conn.) district, **Allis-Chalmers Industries Group.**

K. P. Cox and **S. A. Creson, Jr.,** appointed traveling sales specialists, Medium Transformer Dept., **General Electric Co.,** Rome, Ga.

Allan T. Russell, named special representative, Sales Dept., **Bliss & Laughlin, Inc.,** Harvey, Ill.

Roy Zahn, named sales engineer, New England, Abrasives Div., **Elgin National Watch Co.**

E. F. Koenig, appointed technical representative, Technical Services Div., Research and Technical Dept., **The Texas Co.,** Beacon, N. Y.

Howard A. Sheppard, appointed asst. chief accountant, Wire Rope Div., **Jones & Laughlin Steel Corp.,** Muncy, Pa.

Marshall N. Waterman, named commercial engineering manager, Large Lamp Dept., **Westinghouse Lamp Div.**

John J. Zimmerman, appointed employment supervisor, **Blaw-Knox Co.,** Pittsburgh.

W. E. Staff, Jr., appointed applications engineer, **J. B. Rea Co.,** Santa Monica, Calif.

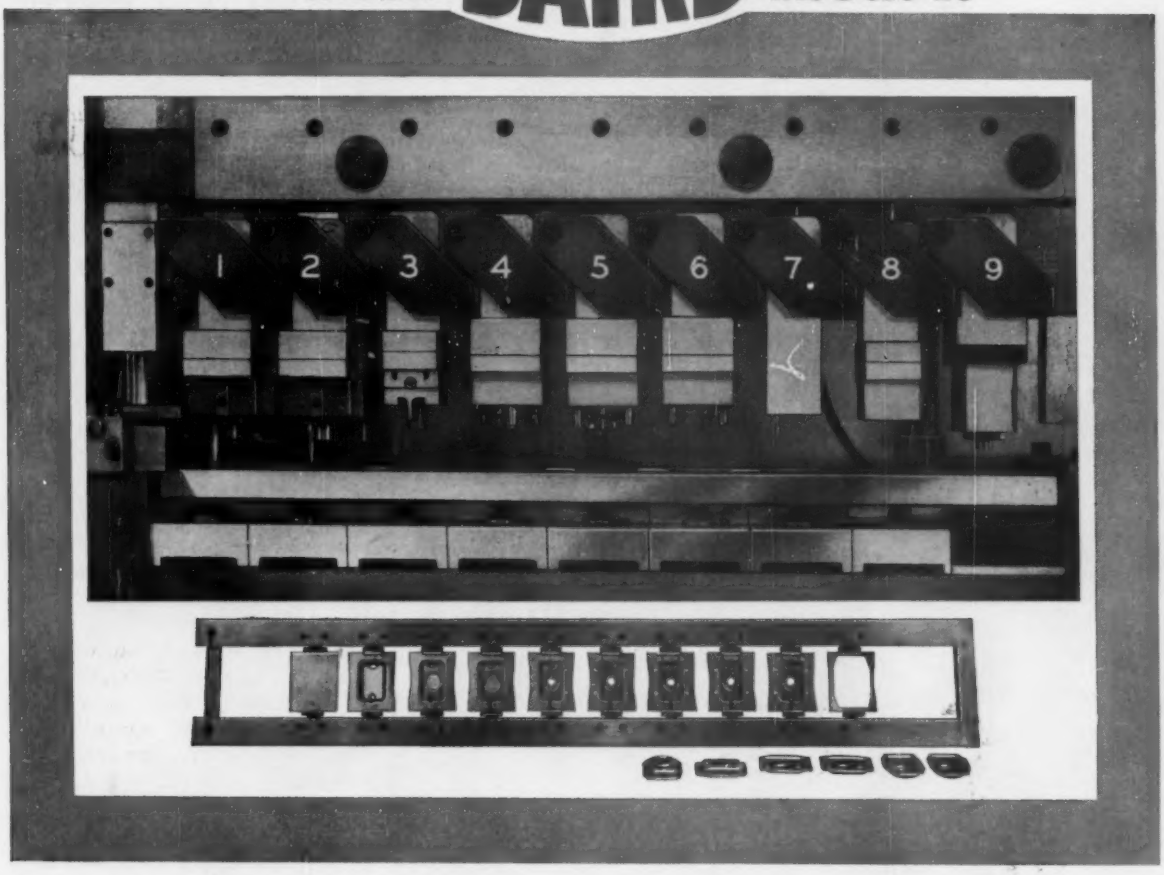
FRED R. SMITH, JR., named division superintendent, steel production, Gary Steel Works, U. S. Steel Corp.

DENNIS J. CARNEY, named division superintendent, steel production, Duquesne Works, U. S. Steel Corp.

WALTER L. LONGNECKER, named Cleveland district manager, operations, American Steel & Wire Div., U. S. Steel Corp.

JAMES H. BRAY, appointed manager, Roll Dept., Birdsboro Steel Foundry and Machine Co., Birdsboro, Pa.

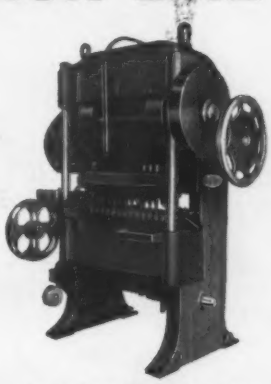
...ask BAIRD about it



How to make money on a "FOUR-FOOT PRODUCTION LINE"

This typical tooling on a Baird Automatic Multiple Transfer Press is, in effect, a complete production line for oven switch plates and a very profitable one at that. Because not only does this machine produce at the rate of 3,600 pieces per hour day in and day out but, like all Baird Multiple Transfer Presses, tool maintenance is extremely low; tool changes when required are very quickly made with minimum down-time.

You, too, can enjoy this kind of HIGH SPEED, HIGH ACCURACY, LOW COST and SMOOTH RUNNING production by combining operations on Baird Automatic Multiple Transfer Presses. Because of Baird's exclusive design, with such important features as gate dwell and new type of transfer mechanism, MORE operations of MORE different types are now possible in a single tooling. It always pays to "ask Baird about it" before you tool. Write Dept IA.



Industry's lowest cost press production methods

Interested in Deferred Payment? . . . "ask Baird about it."

THE BAIRD MACHINE COMPANY
STRATFORD CONNECTICUT

6BA56A

PERSONNEL

Vernon Ellison, named asst. controller and **Patrick Dinan,** appointed asst. to traffic manager, **Armco International Corp.,** Middletown, O.

W. Roy Koll, named direct factory representative, **Fischer Special Manufacturing Co.,** Cincinnati, O.

Roy Hawkes, named purchasing agent, **Harper Electric Furnace Corp.,** Buffalo.

George Stout, named junior sales engineer, midwestern territory, **The Cambridge Wire Cloth Co.,** Cambridge, Md.

Phil B. George, Jr., named display designer and coordinator, **Reynolds Metals Co.,** Louisville, Ky.

Frank J. Mitchell, named consultant, **National Malleable and Steel Castings Co.,** Cleveland; **Walter W. Matzke,** named asst. manager, technical services, Railway Div.

J. M. Krese, appointed superintendent, Banning Coal Mines, **Republic Steel Corp.**

Paul W. Schoenlaub, appointed manager, Chicago, National Accounts Dept., **Stran-Steel Corp.**

R. L. Broderick, named Houston district manager, Autronic Process Controls Div., **The Swartwort Co.,** Cleveland.

OBITUARIES

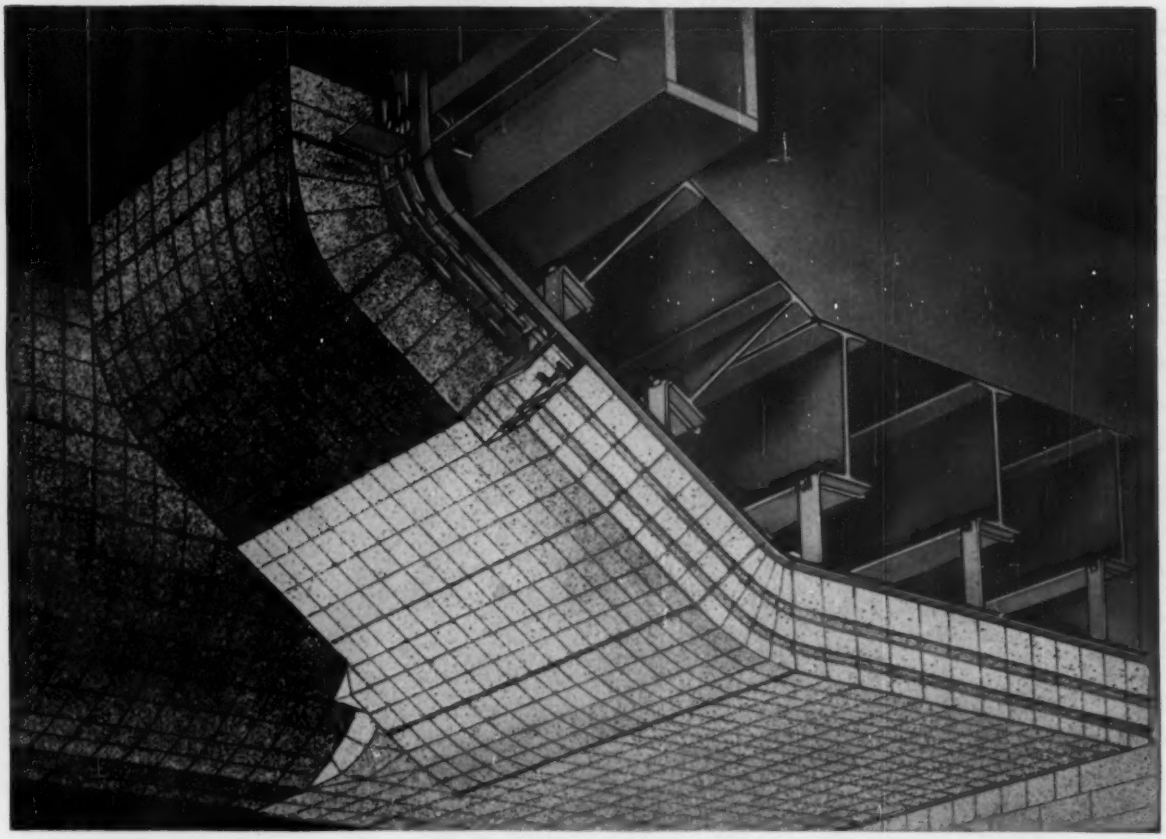
F. W. Swanson, Sr., 71, founder and retired chairman of the board, **Globe Hoist Co.**

William F. Brannan, 63, president, **Anchor Post Products, Inc.,** Baltimore, Md.

Fred B. Putman, Sr., plant superintendent, **The Mosher Steel Co.,** Dallas, Tex.

J. J. Hanney, 58, sales representative, **Metal & Thermit Corp.**

New trends in the use of refractories



LACLEDE-CHRISTY develops new arch for metallurgical furnaces

This new furnace arch design saves installation time, saves money and features adaptability never before achieved with refractory arch construction.

The Laclede interchangeable type arch proved its money and time-saving value by more than one year heavy duty steel mill service. Service records show from 850 to 1000-heat campaigns. It is particularly suited for fantail and chill arches in open hearth furnaces, and heating zone arches in reheating furnaces as well as copper reverberatory furnace arches.

Basic tile or clay tile may be hung interchangeably on the supporting structure, as service experience requires. The design permits adequate expansion of tile during heating up and continued furnace service. Minimum number of tile shapes are required.

Lug castings engage the tile on the bed joints, allowing easy installation. Heavy shelf castings prevent cumulative overload.

Money-saving performance can be expected when this interchangeable type arch is built with Laclede's Peerlac refractory (60% alumina) in 12 in. and 15 in. depths, and with basic refractory steel encased. Supporting structure of steel weldments and small heat-resisting castings are also available for prompt shipment.

This example of Laclede advancements in refractory service demonstrates one more point: it pays to make Laclede-Christy your first refractory source.

HKP LACLEDE-CHRISTY FOUNDED 1944 COMPANY

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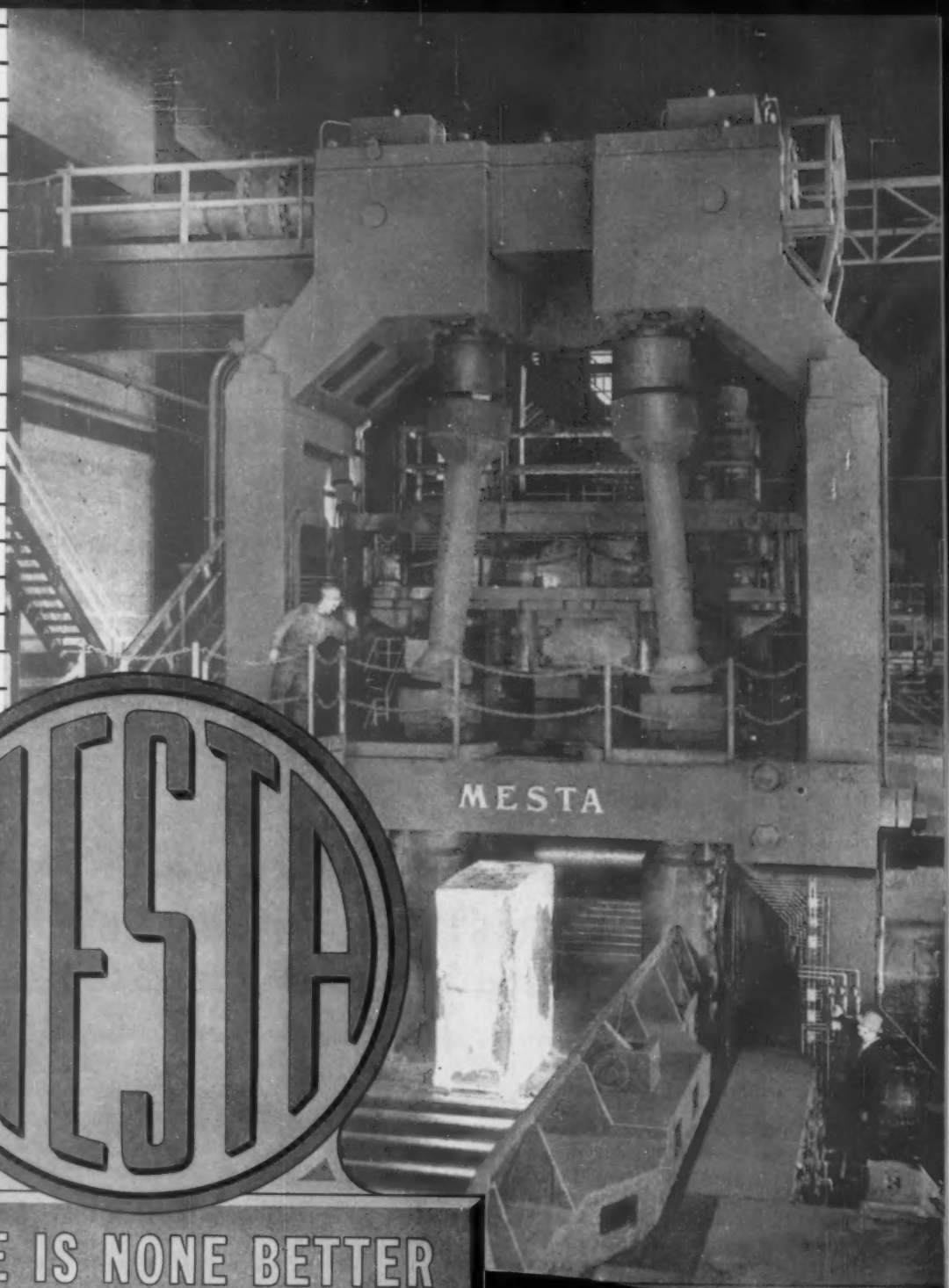

MESTA

THERE IS NONE BETTER

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of complete **STEEL PLANTS**

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PITTSBURGH, PENNSYLVANIA

Welds better—

New Magnesium Alloy For Sounder Castings

◆ Less tendency towards microporosity, better response to heat treatment, good castability—these are some of the many advantages offered users of a new Mg-Al-Zn alloy.

◆ Usable in both the as-cast and heat treated conditions, this alloy combines attractive mechanical properties with a casting soundness that lowers reject rate.

By **W. E. PEARSON,**
Research and Development Engineer,
and **T. E. LEONTIS,**
Chief, Casting Section,
Metallurgical Laboratory,
The Dow Chemical Co.,
Midland, Mich.

◆ A NEW ADDITION has been made to the Mg-Al-Zn family of commercial castings alloys. Its designation is AZ81A. Most important, it provides both foundry and consumer with a number of distinct advantages.

To begin with, the new alloy retains the favorable casting characteristics of AZ91C and responds more readily to solution heat treatment. Secondly, its tendency toward microporosity is relatively low. This characteristic gives the new alloy an important advantage over AZ63A.

From the application standpoint, AZ81A is suitable for use

Fig. 1—Drag and cope views of "slope castings" used for obtaining mechanical test data illustrate the variety of section thicknesses obtained. This correlates closely with conditions on shop castings.

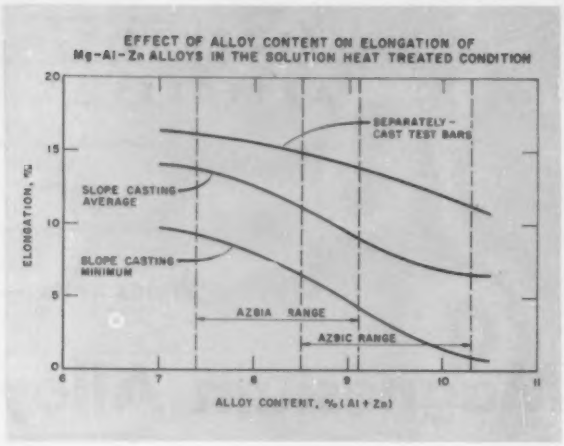


Fig. 2

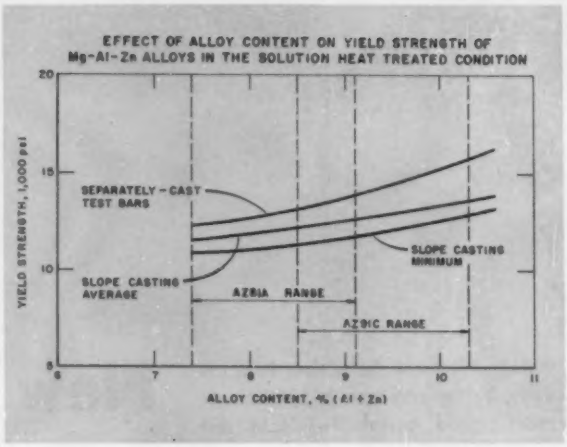


Fig. 3

Castability, response to heat treatment, mechanical properties are good

in either the as-cast, solution treated, or aged conditions. In each case, its mechanical properties are comparable to those of AZ63A. It is this happy combination of good castability, response to heat treatment, and attractive mechanical properties which underlines the new alloy's commercial significance.

Nominal composition of the new alloy is 7.6 pct Al, 0.7 pct Zn, with a minimum of 0.13 pct Mn. It is reasonably similar to other alloys which have been popular in both Europe and Canada for many years. Except for its higher zinc content, it is a close cousin of Dowmetal A (AM80A).

Thoroughly checked out

The new alloy has been rather thoroughly evaluated in both laboratory and production foundry of Dow Chemical Co., Midland, Mich. In the laboratory, tensile measurements were accumulated on both standard, separately cast test bars and bars machined from experimental castings.

The test casting is referred to as a "slope casting." Its size and shape can be seen in Fig. 1. One of its uses is to obtain some measure of the effects of section thickness on mechanical properties (Ref. 1.) For laboratory purposes, AZ81A test bars and castings were generally solution treated at 790°F for 16 hours.

In production, the anti-germination schedule listed in Table 1 is ordinarily used. There is little likelihood of germination occurring, but this cycle allows AZ81A castings to be heat treated in the same furnace with AZ91C parts. A treatment of 16 to 18 hours at 780°F would produce the same results.

Tensile test results on test bars and slope castings in the T4 (solution treated) condition are shown in Figs. 2, 3 and 4. These 13 laboratory melts cover the composition ranges of both AZ81A and AZ91C.

The effects of alloy content on tensile properties are also of interest. As evaluated in these tests, alloy content is taken to mean the sum content of aluminum and zinc, with zinc content never exceeding 1.0 pct. As alloy content is increased from 7 to 10 pct in slope castings, both percent elongation and tensile strength decrease. Yield strength improves with increasing amounts of Al and Zn.

The fact that tensile strengths in test bars are improved by higher alloy content while strengths in slope castings decrease reflects the problems encountered in solution treating thick sections. Both the large quantity of undissolved, massive $Mg_{17}Al_{12}$ present and the greater porosity tendency in heavy sections of the slope casting cause the fall-off in strength and elongation.

Dow's foundry has produced AZ81A castings in production quantities. Typical castings have been sectioned for test purposes. In some cases, other alloys such as AZ63A, AZ91C, and AM100A have also been checked for purposes of comparison.

Casting "A" is a medium-size, sand-cast aircraft wheel. Results obtained for this casting in four different alloys are shown in Table 2. The superior combination of tensile properties found in AZ81A-T4, along with its improved response to heat treatment, are evident. The results shown for AZ81A and AZ91C, in particular, were derived from a large variety of castings.

Checked large castings

A number of other typical production castings were also tested. Tensile properties of three different production castings are shown in Table 3. Casting "D" (AZ81A) shows the minimum properties of 3 pct elongation and 23,000 psi tensile strength. These represent the lowest values of the castings tested. The next lowest value are 6 pct elongation and 27,000 psi tensile.

Results of these tests indicate that improved levels of both

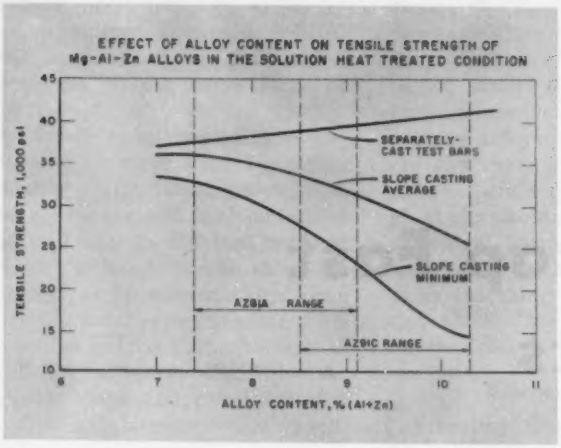


Fig. 4

TABLE 1

COMPOSITION, HEAT TREATMENT & PROPERTIES OF AZ81A ALLOY

COMPOSITION RANGE: 7.0-8.1% Al, 0.40-1.0% Zn, 0.13% Mg. Min.

TEMPER	TENSILE PROPERTIES					
	TYPICAL			MINIMUM		
	% E	Y.S. KPSI	T.S. KPSI	% E	Y.S. KPSI	T.S. KPSI
F	6	13	28	3	10	24
T4	12	13	40	7	10	34

HEAT TREATMENT (T4 Temper) 780° F (6 hrs.) + 670° F (2 hrs.) + 780° F (10 hrs.)

percent elongation and tensile strength are obtained in AZ81A castings. Minimum values, in particular, are raised significantly. This improvement is largely due to the ease of heat treating the alloy.

In all other respects, AZ81A is equal or superior to other commercial Mg-Al-Zn casting alloys. It responds satisfactorily to grain refinement either by superheating or carbon treatment. Also, it checks out as being the most stable of available commercial casting compositions.

Short-time elevated temperature tensile properties and creep strength are equivalent to those of AZ91C and AZ63A. Impact strength is about the same as that of AZ63A. Fatigue strength fails in the scatter band determined for the other alloys found in this system.

Welds better too

The newer alloy also has the advantage of superior weldability. It welds better than AZ63A, AZ92A, or AZ91C. Cast parts may be readily welded to wrought alloys of the same general type. All commercial surface treatments for magnesium alloys—including electroplating—can be applied by the usual methods with good results.

Already accepted as a standard alloy by ASTM, AZ81A is now being considered for inclusion in a Federal specification.

Ref. 1.—W. E. Pearson, *Transactions*, A.F.S., Vol. 54, (1956).

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*

EFFECT OF COMPOSITION ON PROPERTIES OF CASTING "A" **TABLE 2**

ALLOY	TENSILE PROPERTIES						Compound Ratings, Range	Grain Size, Range
	AVERAGE*			MINIMUM				
	% E	Y.S. KPSI	T.S. KPSI	% E	Y.S. KPSI	T.S. KPSI		
AZ63A-T4	8	14	30	3	11	20	1½-4	.006"-.008"
AZ81A-T4	12	13	34	6	12	26	0-1½	.008"-.012"
AZ91C-T4	7	15	33	2	13	22	1-6½	.005"-.010"
AM100A-T4	4	17	29	1	15	21	1½-6	.006"-.015"

* Averages of two castings, each from a different melt.

EFFECT OF COMPOSITION ON PROPERTIES OF MG1AI-ZN SAND & PERMANENT MOLD CASTINGS **TABLE 3**

ALLOY	Casting	No. of Castings Tested	TENSILE PROPERTIES					
			AVERAGE			MINIMUM		
			% E	Y.S. KPSI	T.S. KPSI	% E	Y.S. KPSI	T.S. KPSI
AZ91C-T4	Sand Casting "B"	2	9	13	28	3	11	19
AZ81A-T4	Sand Casting "B"	2	10	13	33	4	11	25
AZ81A-T4	Permanent Mold Casting "D"	7	11	13	34	3	12	23
AM100A-T4	Permanent Mold Casting "E"	15	8	16	36	4	14	33
AZ81A-T4	Permanent Mold Casting "E"	20	14	14	38	11	12	36

Mate handling, production—

Handle Press Scrap Fast For Bigger Profits

By J. E. HYLER, Consultant, Peoria, Ill.

◆ SCRAP HANDLING is an individualized affair. Each scrap yard or plant conceals within its gates certain problems that almost require a tailored scrap handling system.

But even among these uncounted needs, the goal in all cases remains the same: To collect scrap and deliver it to a central disposal point with the least possible trouble and expense.

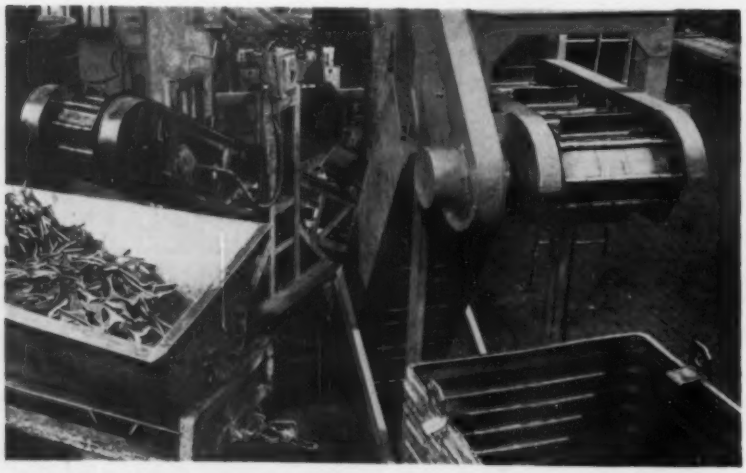
The primary concern here is collecting, moving and disposing of clippings, ends, punchings, skeletons and the like, as opposed to chips. These usually originate in pressing, stamping and shearing operations.

To dispose of scrap, you first must collect it. For the plant, this starts at the machine. In some instances, it still involves hand raking into a conveyor trough, tote box or pit. Efforts to cut manhour requirements in this area pay off well.

◆ **Collecting, moving, disposing of stamping and shearing scrap usually calls for specialized setup . . . Average size, volume and type of scrap determines which handling equipment to use.**

◆ **Skeletons from stamping coil stock wind neatly into high-salvage rolls . . . Stringy scrap succumbs to special machines twirling it into compact bundles . . . Magnets handle clippings and ends.**

Air blast valves sometimes suffice to clear away metal scrap from presses. Such valves find chief use for unloading workpieces. In both applications, they allow the machine operator to devote full attention to loading the die. In this way, they can save considerable time and increase output.



PRESS SCRAP goes one way, blanks the other—both conveyed directly from stamping press. Apron Conveyors handle both jobs fast.

Standard valves working at 50 psi shop air pressure will blow out pieces of scrap weighing up to 5 oz, when fitted with a ½-in. nozzle. With a ⅜-in. nozzle and 100 psi pressure, 2-lb pieces can be ejected. Each blast of air must be precisely timed. A cam mounted on the press crankshaft does this.

Compound blanking dies free the stamping and its punching at the top of the press stroke. It's necessary there to use a delayed-action air blast valve. Because of its special air pocket, this valve blows only after the cam passes over the valve roller.

Scrap winders help

Where continuous coil strip feeds automatically into blanking presses, a one-piece scrap skeleton can result. A scrap winder at the press outfeed automatically rolls up this skeleton for quick handling and easy disposal.

The manufacturer who provides coil stock feed reels usually will supply winders. Like the feed reels, some winders can incline to 45° and adjust in height.

A few winders are driven by an adjustable friction device set to produce desired tension on the scrap skeleton being wound. A

control arm runs on top of the scrap skeleton as it coils. On lifting or lowering of the control arm, the winder drive stops or starts.

Certain scrap is stringy in nature. You meet such in plants dealing with steel, aluminum, brass, copper and lead materials, as well as with different types of wire. For handling and salvaging stringy scrap economically, some use a special scrap bundler. This machine quickly forms a compact cylinder of scrap that handles, stores, ships and remelts easily.

One such bundler makes up cylinders 18 in. diam by 18 in. long. Another develops a 24-in. diam by 24-in. long bundle. Weights of scrap bundles will vary with the material handled.

In the bundling machine, stringy scrap winds tightly on the spindle as the latter spins. To loosen a completed bundle for removal, the spindle drive is reversed momentarily.

Safety's a factor

In some plants, scrap disposal presents a real problem. This applies particularly where an exceptionally large volume of sheet metal parts are blanked and processed. The faster scrap moves from the working area, the better for production output as well as the safety record.

In some cases, conveyors are clearly indicated. More than a few plants have found underground conveyors their answer. Scrap chutes at specific machines can drop scrap directly to a conveyor below, which may itself deliver into a cross conveyor.

Many different kinds of conveyors can carry scrap sheet material. Selection depends partly on plant circumstances, partly on the individual user's preference. Numerous scrap handling installations, including those in reclamation plants, use apron conveyors for the job.

Vibration moves scrap

Vibrating conveyors of exceptional length have been used for handling scrap. In one such setup, a 13-magnet vibrating conveyor moves scrap 65 ft from a rotary shear. Such lengthy installations already exist in several Eastern steel mills.

In moving ferrous scrap, the handling engineer almost automatically thinks of magnets. Where conditions permit use of magnets for bulk handling, they always should be seriously considered.

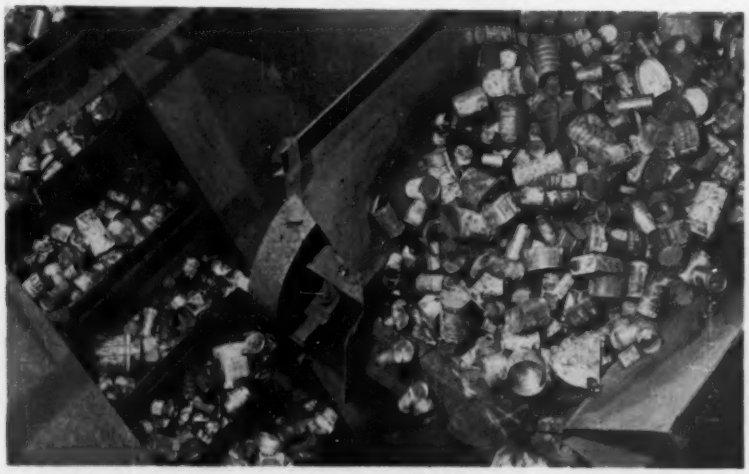
The magnet conquers many otherwise insurmountable handling difficulties on various kinds of ferrous scrap. Plate scrap, heavy melting scrap, cropped ends and punchings — all lend themselves to magnetic handling. Hot scrap too is moved by magnet. Below the Curie point (about 1400°F), temperature makes little difference.

HEAVY DUTY electromagnet, also usable on skull-cracking work, lifts chunky scrap readily.

Scrap handling duties of electromagnets include loading and unloading of scrap into and from motor trucks and railway cars. They also load charging buckets in steel foundry service, charge balers, handle slag and perform various other duties. To round out the picture, electromagnets handle baled scrap just as efficiently as loose material.

Where electromagnets undergo particularly heavy scrap handling duty, a basket magnet can be employed. Four heavy "ears" cast integrally in the heavy cross section of the magnet's outer ring ward off damaging blows, and greatly increase magnet life. Such magnets are often used on skull-cracker work. Other magnets, of more or less special design, have been developed for use in slag reclamation, taconite recovery and like duties.

Although electromagnets are generally favored for handling loose ferrous scrap, grapples have also been used to advantage. Some of these grapples are so tined as to secure a strong hold on any type of scrap, regardless of its contours.



SCRAP YARDS benefit from conveyors. Here clean scrap moves up into incinerator at conveyor transfer point.

Substitution guide—

How Simpler Steel Specifications

◆ Specify your steels by the end properties desired, not by specific material or processing technique . . . That's the lesson here in how to get more for your steel dollar.

◆ One large steel user finds its simplified specification guide pays off big by showing where one steel may substitute for another . . . In one case, deletion of a hardness requirement saves $330,000 yearly.

◆ DON'T make your material specifications any tighter than your product quality requires. Specify your materials in terms of the actual properties you want. Provide material specifications with flexibility that will allow the use of acceptable substitute materials —without extra paper work, needless "red tape."

These are a few of the more important pointers served up by the manufacturing research department of a leading automotive company. They are based on sound shop experience. They spell major savings and more efficient manufacturing performance.

Ford Motor Co., Dearborn, believes it has developed a steel specification guide that works, and works well.

According to Assistant Manager Joseph Gurski, in Ford's Manufacturing Research Department, the guide saves more than $300,000 every year just in costs of processing purchasing orders for flat metals. The automaker conserves an additional $330,000 each year by simply modifying a hardness requirement on SAE 5160 steel for rear spring leaves.

Ford achieves such cost reductions by giving the manufacturing department the widest possible leeway in specifying materials.

". . . You can't tell a manufacturer what you want in a finished product, and tell him how to do the job too," said Gurski in a recent talk before American Standards Association. "If you do, you must be ready to accept the results.

Give supplier some leeway

". . . Specify the desired attributes [in the finished product] and permit [the supplier] latitude in materials and processing. . . . Given enough options," Gurski continued, "manufacturing should not have to bother engineering for a deviation from a metal specification, or wait 60 days for a blueprint change. . . ."

POINTS TO WATCH:

■ **Take advantage of profit-making substitutions, but:**

1) Make sure your materials inspection system can adequately check important mechanical properties before substitute materials are brought in and put on the production line.

2) Check on your present heat treating facilities. Make sure they can accommodate substitute materials without costly delays or changes in equipment.

3) Always be sure that your substitute materials can meet all requirements contained on finished part blueprints.

4) Don't substitute materials whose relative machinability differs appreciably from the materials you are now using. Any marked change in machining characteristics may require drastic changes in tooling, machining feeds and speeds.

Lower Costs

TABLE I

Savings in Reducing Flat Metal Purchase Orders

	Actual parts	Covering metal specifications	Parts per specification
1949 (actual)	380	365	1.04
1956 (estimated by extrapolating 1949 figures)	1472	1415	1.04
1956 (actual)	1472	542	2.72
Reduction in specifications		873	

Savings = 873 × 15[1] × 25[2] = $327,375 annually

[1]—Orders placed and releases issued per year per metal specification = 15; [2]—Processing each order costs $25 average

TABLE II

Combine Orders To Cut Costs

Steel sizes, in.	Monthly requirements, lb: Warehouse (@ 8.5 ¢/lb)	Monthly requirements, lb: Mill (@ 5.3 ¢/lb)
0.075 x 36⅞ x 75½		50,000
0.075 x 4 3/32 x 75½	5500	purchased as sheet 0.075 x 36⅞ x 75½ in., and cut to size
0.075 x 5¼ x 75½	6500	
0.075 x 6⅛ x 75½	6000	
0.075 x 7⅝ x 75½	5800	
0.075 x 7 35/64 x 36⅞	6700	
Total strip weight	30,500	30,500
Comparative cost	$2592.50	$1616.50
Savings, monthly		976.00
Savings, annual		$11,712.00

This thinking shows up in most recent Ford material specifications. Take bolt and stud standard M-3500-A, for example. It permits use of AISI C-1013, SAE-1015, -1016, -1017, -1018, -1019 -1020, or SAE 1022. All this without referring the decision on which to use back to engineering.

Even within this specification, great savings are possible. Coiled, hot-rolled AISI C-1013 steel wire 0.218 in. diam substitutes for at least six other steels in nine wires of smaller diameter.

The one steel serves in 35 production bolts, and 9 service bolts. The wire is simply cold reduced to size, from 0.085 to 0.192 in. diam, as required.

In selecting carbon steels, Ford uses its Recommended Practice Specification M-2K2. An example best shows how this works.

Say the engineer determines a part calls for SAE-1020 low carbon steel. Ford's equivalent for this is M-2K2-E. On the drawing goes specification M-2K2-E, instead of 1020.

Seven possible choices

The substitution chart in M-2K2-E permits use of any steel in specifications M-2K2-F through -K instead, if desired. So already seven steels are possible: AISI C-1023, SAE-1020, -1025, -1027, -1030, -1033, or SAE-1035. In the M-2K2-F through K groups are 29 additional steel grades, each of which also may be used.

With this large number of options, it's not necessary for drawings to specify detail material requirements.

Another advantage of this approach lies in the practicality of issuing drawings many months before part production. This provides the lead time so essential in many industries. Transmission orders on recent Fords, for example, were placed 23 months before the model's introduction.

Going back to the SAE 1020 steel mentioned before, the advantages of calling out specification M-2K2-E instead of SAE-1020 become more obvious. When the time for production came in the case cited, it was decided to turn the part on an automatic screw machine.

So a free-cutting steel, SAE-

Table I shows savings that can be calculated fairly accurately . . . more extensive use of standards saved $327,375 in 1956.

1119, was selected from the permitted options of M-2K2-E. At the time the drawing was completed, no one could have known how this part was later to be made, and it would have been impossible to specify this detail.

Consider another example of how this specification guide works. Rear spring leaves call for SAE-5160 steel in one design. Blueprints specified a maximum hardness of Bhn 300 to insure the steel could be blanked. This meant a premium of $330,000 annually.

Studied price books

A close study of price extra books followed. These revealed that Ford could take a calculated risk and could specify "steel suitable for cold shearing and punching as outlined in steel products manual 10." Eliminating the specific hardness requirement saves the $330,000 premium.

A transmission gear machined from hot-rolled alloy steel bar was later pickled, oiled and machine straightened. The straightening operation, it was found, removed a good deal of the scale. So the pickling and oiling requirement was eliminated as a calculated risk. Savings run 45 cents per 100 lb, or about $24,300 annually.

In switching from tubular to solid piston pins, Ford engineers tagged the material specification with an extra, "piston pin quality or better." This because of concern over the closeness of the raw material size to finished pin diameter.

By increasing barstock diameter, the extra could be eliminated. Doing this involved the slight calculated risk that surface imperfections would be machined off in processing. To catch defective parts, the company added magnetic testing.

So by increasing stock diameter 0.010 in., Ford now saves $50,400 annually on its piston pins.

Savings of $8500 per year came about in similar fashion on purchase of stock for a frame reinforcing plate. Downgrading a "special bar quality" requirement as a calculated risk to "merchant bar quality" made possible the lower costs.

Use of preferred sizes in flat metals also helps the standardization effort substantially. For years, industry labored under the handicap of numerous gage systems, each differing somewhat from one another (see accompanying box).

Specifying thickness by gage alone led to confusion. So decimal thickness was necessarily included, e.g., "#20 MS gage (0.0359 inch thick)." After acceptance of the American standard, things simplified considerably. Now Ford drawings merely say "0.036 in. thick."

A small change, yes, but one that is worth something when writing such information on 25,000 drawings yearly.

Table I summarizes a study made in 1956 of flat metal orders. It shows one of the savings that can be calculated fairly accurately.

Note that in 1949, 365 specifications covered production of 380 parts. If parts built in 1956 had needed as many covering specifications, 1415 would have been called for. This is 873 specifications more than actually were written. In 1956, 542 specifications covered 1472 parts.

Order By Thickness—Not Gage

Here's why—20 gage (0.036 in. thick) can mean any of the following:

	Thickness, In.
U. S. Standard (Old)	0.0375
U. S. Standard (New)	0.0359
Manufacturer's Std.	0.0359
Birmingham	0.0350
Brown & Sharpe	0.0320
Washburn & Moen	0.0348
British Standard	0.0360
London Standard	0.0350
Paris or French Gage	0.1732
American Zinc Gage	0.0700

Figure savings this way

Figure an average of 15 purchase orders placed yearly on each specification, at a processing cost of about $25 for each order. Multiply this product by 873, the specifications that became unnecessary through more extensive use of standards and substitution guides. Thus $327,375 was saved in 1956. This just on the handling of purchase orders of flat metals.

Table II illustrates the savings possible by standardizing and combining orders. Cost of 50,000 lb of sheet stock purchased from the mill ran 5.3 cents per pound. The 30,500 lb total of strip stock was obtained earlier through the warehouse at 8.5 cents per pound.

Combining these orders, and purchasing 30,500 lb in the wide sheet at 5.3 cents per pound saves $11,712 annually. This saving more than offsets the cost of shearing to the size strip required.

To Cut Your Steel Bills

- **Do allow manufacturing the widest possible leeway in selecting materials and processes.**
- **Don't assume "extras" are not to be questioned.**
- **Look out for specified steel properties that add nothing to the end product.**
- **Watch for special sizes in purchasing orders.**
- **Consider the calculated risk in specifying materials.**

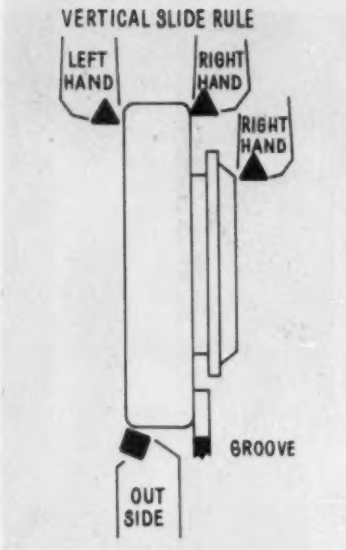
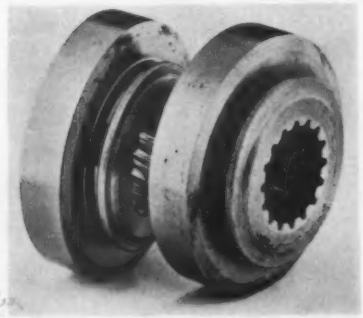


DIAGRAM shows relative position of carbide and cemented oxide tools used in machining sliding gears for auto transmissions.

Cutting rate doubled—

Speed Gear Production With Ceramic Type Tooling



MACHINED chiefly with cemented oxide tools at 1000 fpm, sliding gear at left shows consistently better surface finish. Its all-carbide-machined counterpart was made at 450 fpm.

◆ INDUSTRY'S putting cemented oxide tools through their paces in dozens of production uses, probing their advantages and limitations. Generally, it's finding them good medicine for a number of machining ills.

Latest favorable performance report comes from Ford's Standard Transmission & Radiator plant in Dearborn. One operation involves machining sliding gears for transmissions. Ford was unhappy with it because they felt that: (1) they were changing cutting tools too often, (2) cycle time per-piece was too long, and (3) finish was a problem—and 100 pct inspection was impractical.

Also, one machine wasn't enough to meet required production schedules. But two machines provided too much capacity.

Several months of actual production experience with cemented oxides, tried on an experimental basis, has borne out the claims made for the new-type tooling. Experience shows:

(1) Tooling changes down. Longer-lived cemented oxides are changed every 8 to 16 hours, produce some 1600 cuts per tool edge.

(2) Cycle time down, with cutting speed increased from 450 to 970 sfm.

(3) Consistently good finishes with profilometer readings 85 rms.

(4) One machine is now sufficient, and second is reassigned.

The work at Ford requires finish turning, grooving and facing the transmission low and reverse sliding gear on a Sundstrand automatic lathe. This is a standard machine, modified by Ford for the extra rigidity and speed needed with cemented oxide cutting tools. Taking up the spindle bearings gave the necessary rigidity. Scraping tool slides minimized backlash.

Use insert-type holders

The part, of 5135 forged steel with a hardness of 170 to 207 Brinell, measures roughly a little less than 4 in. in diam. It is roughed out on a Bullard 8-in., 8-spindle Multimatic prior to machining on the Sundstrand lathe.

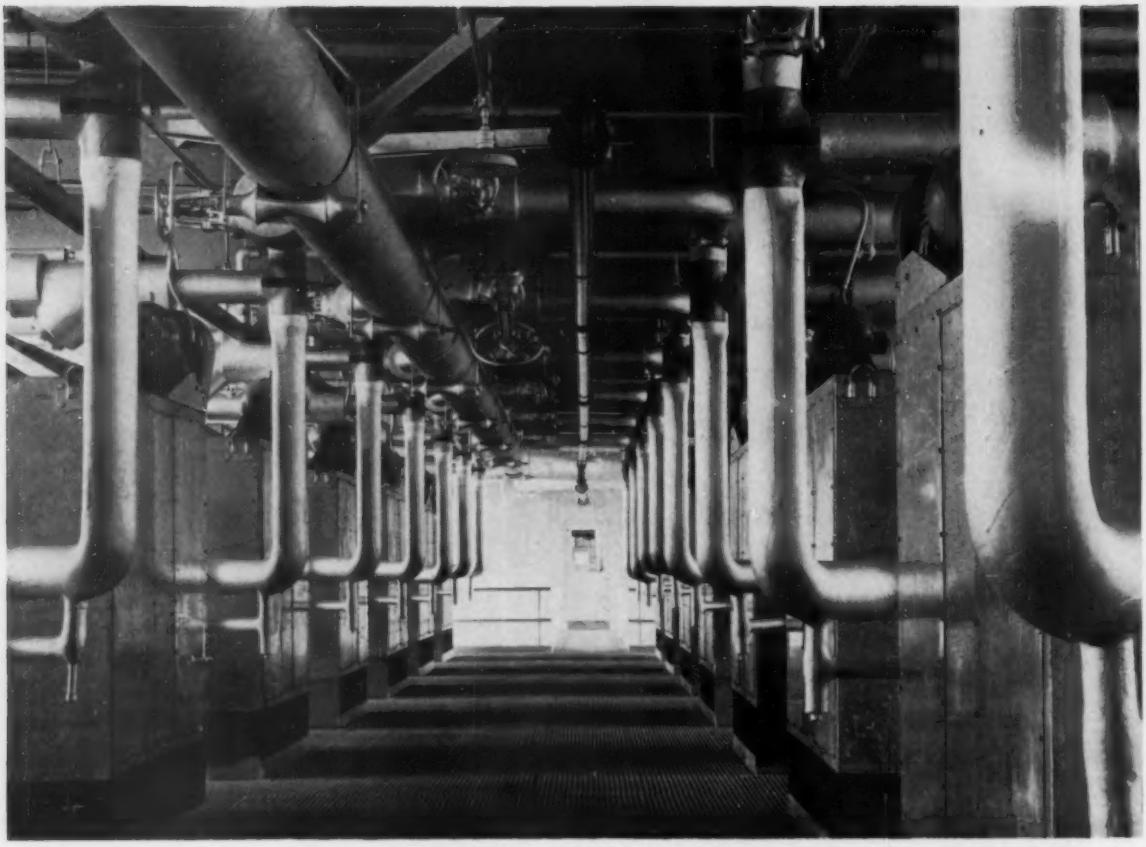
Insert type holders for throwaway cutting tips are used. The lathe is tooled up so cutting tools converge on the work from three directions—front, top and back.

Five cutting tools are involved in the operation, three of Carboloy cemented oxide O-30, two of carbide. A ½-in. square cemented oxide tool is used in the front holder for the work OD, and two ⅛-in., inscribed circle, triangular cemented oxide tools are used in the back for facing cuts. A carbide grooving tool between them sizes the 5/16-in. deep, 0.203-in. groove.

The top tool is a ¼-in. inscribed circle, triangular-shaped carbide. A feed of 0.015 in. is used at 970 fpm. The work itself is held on a stub type, expanding arbor fixture.

No coolants are used. Previously, carbide tools were used in all tool holders in the setup and coolants were required. Production average was only 350 parts per tool index, and carbides had tended to lose out in holding size.

Ford engineers report the OD tool with cemented oxides produces approximately 1200 parts per corner, and sometimes 3000. They see possibilities of boosting surface speeds to 1500 fpm, if other tools can be found to match the pace of the three cemented oxide tools. This would also call for more lathe rigidity and speed.



EVAPORATIVE COOLING equipment has total capacity of 725,000 cfm. Temperature holds to within ± 5 F in several plant areas.

Let Conditioners Clean Up Your

◆ Most plants either "put up" with their local problem areas of heat, smoke or chemical fumes or — if they're severe enough—apply local correctives . . . But is rigging up fans, blowers, special hoods enough? Air conditioning may offer more advantages in the long run.

◆ This plant went whole-hog and put in plant-wide conditioning . . . With combined metalworking and chemical operations, it protects product quality as well as workers' comfort and safety . . . Year around efficiency's up . . . Hiring and holding employees is easier.

By W. G. PATTON, Engineering Editor

◆ MANY metalworking plants heat, chemically clean, plate, paint or otherwise treat products — in such a way as to create problems of heat, smoke or fumes. These can add up to nuisance only, or to an outright hazard. Yet simple fans, blowers, hoods, and the like will often solve them.

Air conditioning is another approach more and more plants are taking. Installed either in local problem areas or plant-wide, it's helping improve worker efficiency and product quality.

At the same time, it makes for more attractive working conditions. Employees are easier to hire and easier to hold.

Example of what can be done is Delco-Remy's new 185,000-ft. battery plant at Olathe, Kansas. This is the first plant of its kind in the country to feature 100 pct air conditioning and modern, continuous-line processing. Temperature and humidity control go hand-in-hand with many of its metalworking operations. Temperature control is vital too on chemical operations (and many are involved) like conversion of lead to lead oxide powder and the electrochemical conversion of the battery plates.

Capacity of Delco-Remy's evaporation cooling plant is 725,000 cfm. A 700-ton air conditioning system creates excellent year-around working conditions in an area where 10-below winter extremes and sweltering summers are quite common. Total capacity betters 1,025,000 cfm.

Down-draft cooling prevents any danger of lead-laden dust contaminating the air. The capillary cooling system used cools all of the manufacturing areas where large amounts of heat are generated. These take in melting, casting and hard-rubber case-forming areas.

To hold down the mixing of air cooled by the two separate systems a pressure differential is maintained. A baffle wall also extends from the ceiling to within 12 ft of the floor.

Making 7500 units daily

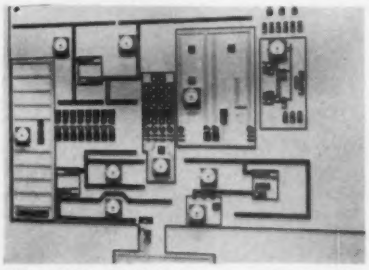
The plant is producing 7500 batteries a day. Rate has been climbing steadily since the plant's opening a few months ago. Total capacity is 11,000 batteries during a 16-hour day. Both wet and dry batteries are manufactured.

All batteries are made by the "dry charge" method. However, dry batteries are filled with electrolyte at the plant before delivery to General Motors plants at Kansas City and Arlington, Texas. More than two-thirds of the plant's output is of dry batteries for General Motors' United Motors Service Div.

Temperature is controlled to within ± 5°F in several plant areas. Control is vital in the areas devoted to plate curing and the storage and assembly of dry charged plates. Plates are activated on conveyors that are 160 ft long, and move steadily in a bath of sulphuric acid. The smell of sulphuric acid, particularly noticeable around most battery plants, is absent at Olathe.

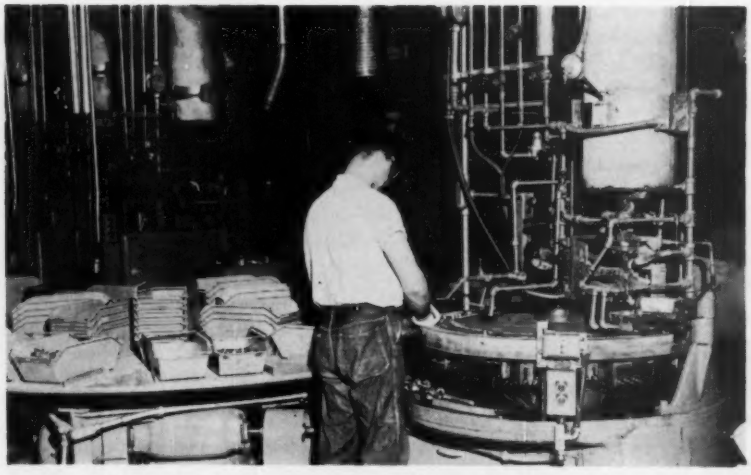
This is accomplished by funneling a continuous air flow of 300,000 cfm in to counteract fumes from the bank of electro-chemical cells. Acid-contaminated air is collected, completely neutralized and filtered before discharge to the outside atmosphere.

Besides several large centrifugal units where lead in pig form is converted into finely divided powder, Delco-Remy operates a large group of permanent mold machines. Many of these cycle automatically, including loading and unloading. Permanent-mold-made parts include grids, terminals and connectors.



MASTER CONTROL board permits central regulation of entire conditioning system. Capacity's about 1,025,000 cfm.

Air Problems



LOCAL HOT AREAS near processing equipment like this rotary permanent mold machine are made more comfortable by year-around conditioning.

Delco's continuous line for converting plates includes the electrical charging or conversion step, washing, and drying operations. Atmosphere control is closely held at all stages. An alarm sounds, for example, if oxygen is detected in drying ovens.

Assembly of batteries, heretofore a backbreaking and tedious job, has been greatly simplified. Automatic inspection has taken much of the monotony out of it. Provided at a number of stations along the line, automatic inspection arrangements include a "memory" arrangement. This permits defective batteries to remain on the line, but eliminates any further processing on them by automatic equipment. Batteries index automatically on the line. Work stations and automatic inspection stations interlock electronically.

Altogether, there are four such automatic inspection stations. These check for electrical resistance, short circuits, acid leaks and electrolyte level. The memory circuit makes note of any defects.

Assembly follows a fairly simple sequence. Both 6 and 12 volt batteries are made on the same line. Hard rubber cases feed to the start of the line from a conveyor. Cells are inserted and cover alignment is checked. The batteries then move automatically through 16 work stations.

Templates are used to permit operations, at certain automatic stations, on both 6 and 12 volt batteries. These can be either wet or dry types when completed.

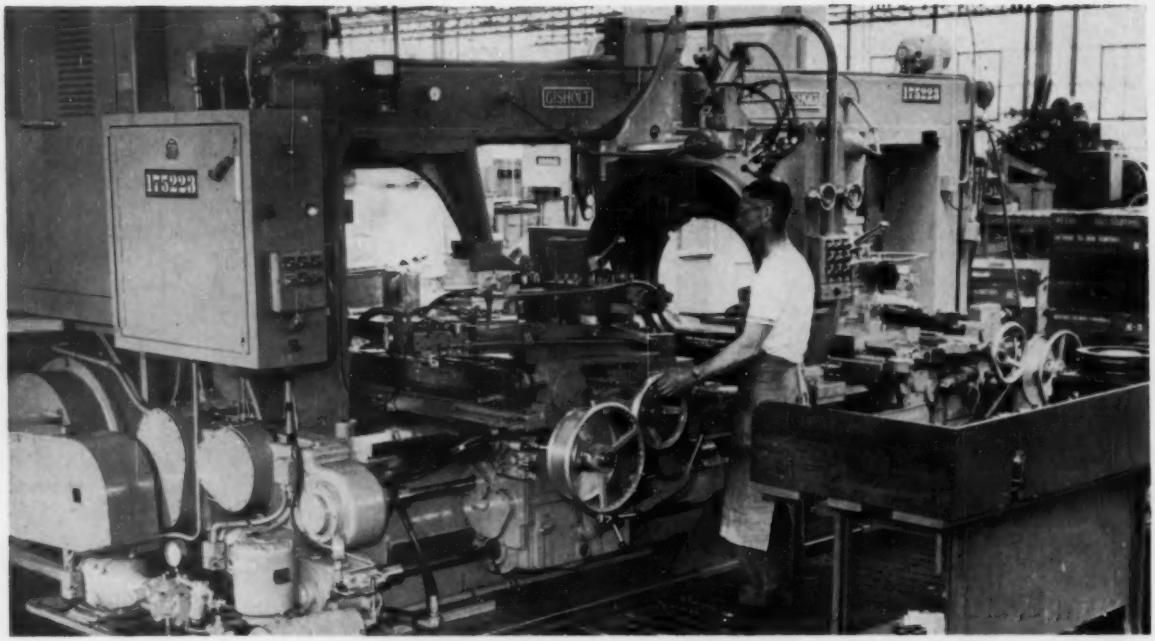
Automatic or semi-automatic operations on the new Delco battery line include fusing of lead cell connectors, molding positive and negative terminal posts into place and shaping ends of posts.

For best service life, batteries must be preheated prior to sealing. Sealing compound then flows automatically into place. The battery is then de-bubbled, assuring a smooth, tight seal.

Final station on the line feeds vent covers into each of the cell covers and screws them into place.

Tackles both sides—

New Lathe Lops Time Off Schedules



OF NEW DESIGN, this center drive lathe saves more than one-third the time previously needed for machining jet compressor disks.

◆ CUTTING 30 minutes off a 281-minute machining job is an accomplishment. Saving 100 minutes is sensational. That's the feeling of Pratt & Whitney Aircraft, East Hartford, Conn., about one of its new machines.

This reduced machining time has actually been achieved in production on jet compressor disks. The same machine lops off one-half hour from the time previously required to machine jet turbine disks. But saving time isn't the only benefit. Accuracy of machined parts is now far better than ever.

Behind these benefits is a new center drive lathe. A lathe of similar principle had been tried before, but like many prototypes, it had its "bugs." In principle, however, it had merit. E. P. Bullard, Pratt & Whitney's chief of production engineering was convinced of this and concluded that the best way to develop one would be to design and build it from scratch.

Fresh design drawn

Working with the tool design group, he drew up a preliminary design. Gisholt, the machine tool builders, accepted the challenge of building it, modifying the design when and where necessary.

Delivered earlier this year, the lathe was put to work immediately. Only minor defects had to be smoothed out, but on its first job it saved on machining time. It's still being perfected, but it has already proved its potential by saving five to seven operations on jobs for which it is now used.

The machine's ability to cut on both sides of a part simultaneously improves work accuracy. Balancing pressure on each side assures part flatness. Being a tracer-type lathe, guided by a tracing template, it can follow many complex contours.

Having proved its value, Pratt & Whitney ordered 28 more machines of which two have been delivered. These are said to be the first such machines to go on production work in American industry.

MACHINING: Stampings

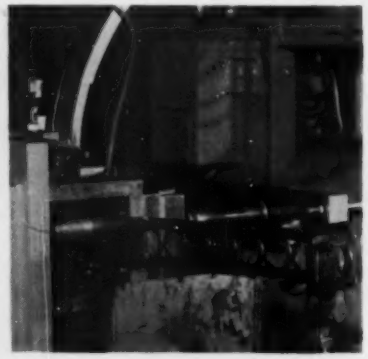
Unit chamfers, reams stamped washers at a high rate . . . Once tool is set, adjusted and machine started, it operates automatically as long as hopper feeds . . . Operator has only to fill hopper.

Scores of stampings go into the construction of Kenmore and Whirlpool home laundry washing machines produced at the St. Joseph, Mich. plant of the Whirlpool-Seegar Corp. One such part is a simple washer that measures 1¾-in. od and has a 1-3/32-in, pierced hole. The washer subsequently becomes a flange for a tube whose end is spun into a chamfer at the washer hole.

Employs Automatic Unit

To produce the chamfer and ream the hole at a high rate, an automatic machine is employed. It includes a combined reamer and chamfering tool driven by a cam feed drill unit.

As soon as the hole is reamed and countersunk by advance of the tool, and the tool is withdrawn, an air plunger pushes the completed washer out of working position



Washers feed out ejection track from the hopper.

into an ejector track. Then, the next washer drops from the magazine, which is kept filled by a rotary hopper, into its machining position. The cycle repeats after the air cylinder clamps the new washer.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 169. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Motions of the air plunger are controlled by solenoid operated valves that respond to limit switches operated by motions of the washer through the magazine. Once the tool is set and adjusted and the machine is started, it continues to operate automatically as long as the rotary hopper keeps the magazine supplied with washers. Hence the operator need only load washers into the hopper.

Forging:

Air Force develops new die forging method.

A controlled precision die forging method for producing propeller hubs has been developed by the Air Materiel Command.

Eliminates Several Operations

The new manufacturing process eliminates the rough crossbore, profiling and several barrel-forming operations prior to the core hardening heat treatment. Propeller hubs produced by this method meet both dimensional and metallurgical requirements for an improved die forging.

The successful development of this new process resulted in a saving in machining time, tool

cost and maintenance. In addition it provided enough conclusive data to encourage the use of similar precision forgings on all future propeller and turbo-propeller hub models.

The Curtiss-Wright Corp., Caldwell, New Jersey, was the prime contractor on the job with forging and press operations done by the Canton Drop Forge and Mfg. Co., Canton, Ohio.

The propeller hub design was improved in order to accomplish the maximum reduction in weight and machining. Coupled with this a precision forging method was developed to produce a full size forging for actual application.

Nonferrous:

Aluminum test plates aid cavitation research.

Engineers studying cavitation pitting rate in hydraulic equipment now have another research tool at their disposal. The tool is an accelerated test for measuring cavitation attack intensity in equipment operating in the field.

The technique uses aluminum test plates fastened to hydraulic-turbine runners. These plates give evidence of cavitation pitting rate. The individual blows which constitute the hydrodynamic attack of cavitation on the guiding surface leave a record on this ductile material. This appears in the form of individual indentations or pits.

Doesn't Remove Metal

Cavitation action on the aluminum does not remove any of the metal, but causes simple plastic indentations like those produced by a mechanical blow. Field tests made on one of the Parker Dam turbines were described for engineers attending the Annual Meeting of The American Society of Mechanical Engineers.

The speaker, R. T. Knapp, California Institute of Technology, said that data obtained in this way supplement the information secured through use of high-speed motion pictures of the cavitation zone. He stated much can be learned about cavitation by study-

ing the sizes of the pits, the rate at which they form, and the location of the pitting area on the test plate with respect to that of the cavitation.

More Study Needed

The speaker described the field testing in detail and compared the results with those obtained in preliminary laboratory tests, with the suggestion that the relationship between pitting rate and cavitation intensity needs further investigation.

Enlarging on this phase he said, "These preliminary field investigations should be extended to cover a wide variety of conditions, in particular, a wide range of the flow velocities in the cavitation regions. These first results imply that the pitting rate may be independent of the size or design of the equipment, effected only by changes in velocity or in physical properties of the liquid. If this should prove to be true, it would be an extremely important finding with far-reaching implications in the design and operation of hydraulic equipment."

Controls:

Punch card operated lathe works from drawings.

More than one year of experimental operation of a punched-card-controlled lathe indicates it is possible for users to speed production by going directly from process drawings to finished pieces.

Experiments conducted by the Sundstrand Machine Tool Co. show that application of a GE numerical positioning control to a new lathe has made it practical to punch control cards directly from process drawings. Once the cards are punched, direct production operations are then possible.

Numerical positioning control (left) operates lathe.

Rapid Changeover

Test results also reveal numerical positioning control has on many jobs brought about an 80 pct reduction in set-up time and a consequent boost in production. This has made it possible for the Sundstrand multi-cycle, single-point machine to produce a wide range of parts with little changeover time.

Operator places punched cards into the control.

The rapid changeover feature is especially significant on small lot jobs. When a changeover in cutting a different piece or cutting an entirely new piece is made on an ordinary lathe, the change may require many minutes. Change time for a comparable job on the Sundstrand Model 14 is only the time required to change the deck of cards. In addition, lathe operation has been simplified by providing ease of adjustment and a reduction of manual operations.

Tests have shown that one man can efficiently operate as many as five punched-card-controlled lathes simultaneously, depending upon the cutting cycle. Moreover, the operator can adjust the lathes for a wide variety of pre-programmed

jobs merely by changing the control cards which direct the machine's operation.

Cards Control Speeds, Feeds

In its present application the model is used for general step turning. Punched cards control the speeds and feeds at which the machine operates. Using this type of control, the lathe has a range of eight spindle speeds and feed rates. It is capable of roughing or finishing over the range of 280-2025 rpm spindle speeds, and 7½ to 29½-ipm longitudinal feed.

The numerical positioning control which directs the operation of the lathe was developed by General Electric's Specialty Control Dept., Waynesboro, Va.

Materials:

Fluorescent mercury lamps improve lighting.

Two new 1000-w semi-reflector fluorescent mercury lamps provide improved color rendition and greater light efficiency.

According to the Westinghouse Electric Corp., the high output lamps make golden-white mercury light practical in high bay industrial lighting applications where fixtures are too small to make efficient use of the fully coated lamp. The new lamps, 220-v and

These 1000-w lamps are practical in high bay lighting.

465-v, are coated only on the half of the lamp nearest the base. This half color-correcting coating serves a double purpose. It acts as a downward reflector and in ad-

dition serves as a color-correcting fluorescent coating. They are recommended for use where uncoated lamps are now installed.

The color of the light produced by the new lamps is reported as good. In addition the amount of light which is usually trapped in the upper neck of the fixture is substantially reduced. Because the reflected fluorescent coating is on the inside of the lamp, light maintenance is substantially better in areas where dirt is present in the atmosphere.

Should Increase Efficiency

The new lamps should increase the efficiency of the lighting system in many installations where the standard fully coated mercury lamps are presently used, Westinghouse believes. They are fully interchangeable with these lamps. The outer bulbs are made of hard glass to resist water cracks and atmospheric corrosion. The guaranteed average life of the new semi reflector lamps is 7000 hours.

Finishing:

Continental electroplating method introduced here.

Extensively used for a number of years in England and on the European Continent, a comparatively new method for localized and selective electroplating is now being used in the United States and Canada.

Repair Worn Components

Applications of the process include build-up and repair of worn components; electroplating of selected areas of electrical contacts and electronic parts; plating of plastic-metal combinations; soldering and selective carburizing; automatic strip and wire plating; plating aircraft components; and for numerous other applications where high-speed deposition is required on small areas without stopping-off or dismantling.

The plating method utilizes a newly designed group of air and water-cooled styluses and a complete range of special non-toxic,

non-fuming metallo-organic solutions. These solutions are capable of plating small areas at amazingly high current densities—in some cases as high as 6000 amp per sq ft.

Among the metals which can be plated are: Bismuth, Brass, Cadmium, Chromium, Cobalt, Copper, Gellium, Germanium, Gold, Indium, Iron, Lead, Nickel, Nickel (Black), Paladium, Platinum, Rhodium, Silver, Thallium, Tin, and Zinc.

Atomic Energy:

Forum publishes booklet on nuclear careers.

In an attempt to dramatize and explain work in the nuclear industrial field to youngsters, the Atomic Industrial Forum has published a 34-page, illustrated booklet on "Careers in Nuclear Science and Engineering." The booklet is based on proceedings of a conference for high school science students.

Contains Quiz Transcript

The conference featured talks by Dr. Eric Walker, President of Pennsylvania State University, Dr. Lawrence R. Hafstad, Vice President and Director of Research of General Motors Corp., and Dr. Frederick L. Hovde, President of Purdue University. The booklet also contains a transcript of a discussion period in which the speakers answered questions posed by the students.

Copies of the booklet are available at 10 cents each from the Atomic Industrial Forum, 3 East 54th Street, New York 22.

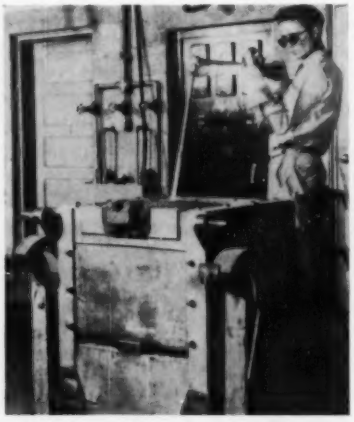
Testing:

System speeds molten metal temperature checks.

For foundry or melt shop, a new measuring system speeds accurate temperature checking of molten metals and alloys. It records both ferrous and non-ferrous materials at temperatures up to 3200°F. The system combines a lightweight immersion thermocouple, designed by Leeds and Northrup Co., with a portable electronic indicator or permanently mounted recorder.

The checking system is expected to be particularly valuable for shops handling a variety of new metals or alloys whose melting points are not accurately known.

Typical uses of the system are: (1) to determine exact "freezing" point of a new melt, so that proper pouring temperature can be established, (2) to indicate when melt in a furnace reaches the established pouring temperature, and (3) to check temperatures of melts at various locations in the shop, such as in transfer ladles, shank ladles, cupola troughs, runner boxes or risers.

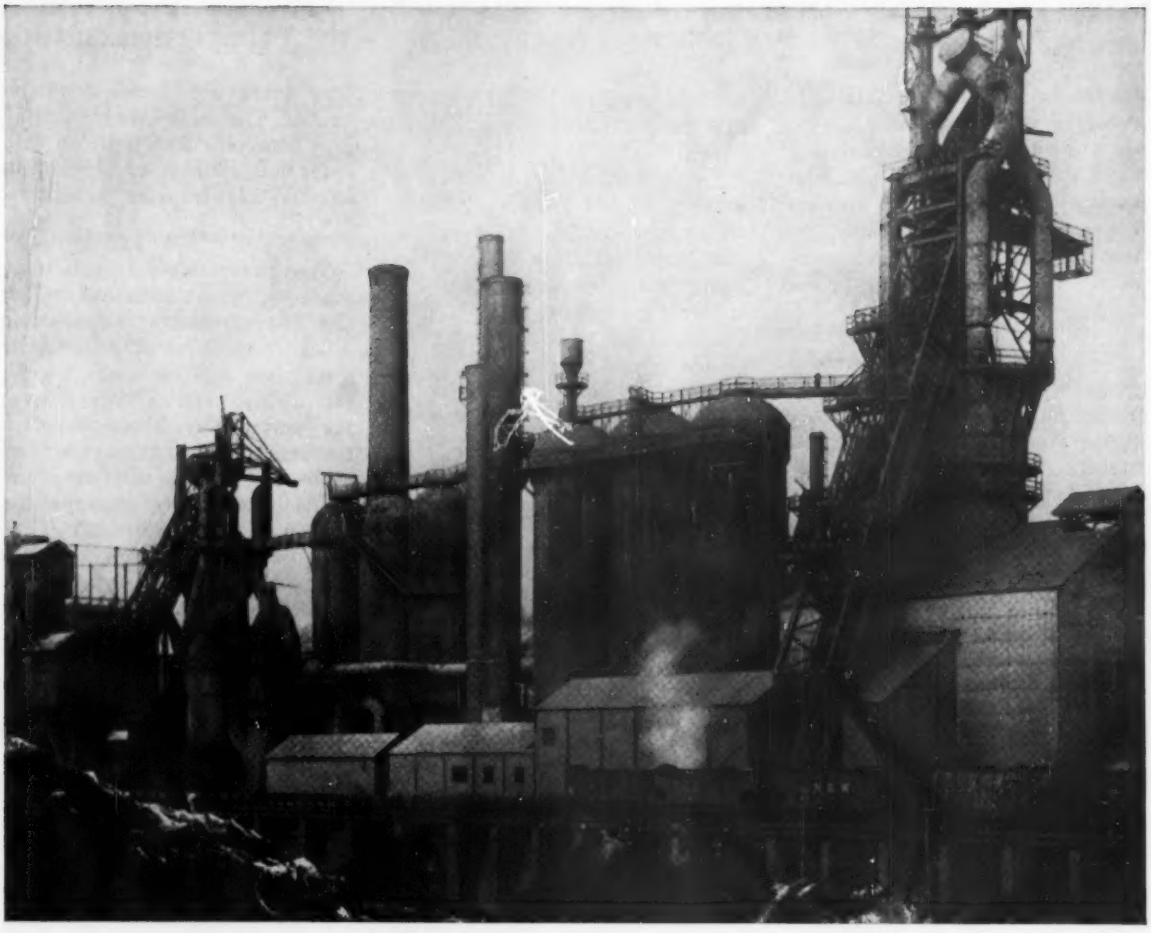


Melter dips tip of thermocouple into melt for 10 seconds.

Components of System

In the setup, the immersion thermocouple is connected by extension wire to either a dial-faced indicator or a strip chart recorder. The small, light indicator (weight: 30 lb) makes it easy for operators to move the complete equipment around the shop for various temperature checks. The recorder is usually mounted permanently in one location and includes a signal light and audible warning system.

L&N engineers adapted the design of their immersion thermo-



Season's Greetings

to

our customers and suppliers
who helped make 1956
another good year for DSC

Customer
Satisfaction
is Our
Business

The above is a view of the two blast furnaces at our Portsmouth (Ohio) Division. At the left is the original 700 ton furnace. At the right is the new 1,400 ton furnace, one of the industry's largest

DETROIT STEEL CORPORATION
DETROIT 9, MICHIGAN

couple. Like the larger bath temperature couple, the new equipment includes an auxiliary quartz sheath on the end of its platinum thermocouple. The sheath protects the rare metal couple, thereby sustaining high measurement accuracy.

Measuring "Freezing Points"

To set-up the ideal temperature program for a casting job, the melter knows the proper pouring temperature equals the metal's "freezing" temperature plus the degree of superheat necessary to overcome heat loss during handling, transfer, etc. He can therefore insert the thermocouple's quartz sheath an inch or two into a spoon of the molten metal and let the melt solidify around the tip. The indicator shows a leveling off in the temperature drop as freezing occurs. This constant reading is the freezing point to which he adds the superheat established by shop practice, giving him the required pouring temperature.

The thermocouple assembly is easily detached from the sheath which remains frozen in the test sample. A stainless steel chuck holds the sheath and permits simple replacement with a new sheath, after which the thermocouple assembly is ready for immediate service.

In experimental laboratories, freezing point measurements are sometimes made directly in small research furnaces.

Metallizing:

Sprayed metals solve heat-transfer problems.

A manufacturer of gas refrigerating units uses sprayed aluminum to improve the heat transfer characteristics. Walls of the piping where the heat exchange is to take place are tack-welded together. The joint throughout the pipe lengths is then built up with sprayed aluminum to provide an effective heat transfer "bridge."

Corrosion Protection Too

The gas refrigerating unit is made by Servel, Inc., Evansville, Ind. The refrigerator, unlike other types, is made up of a series of steel pipes and chambers welded into a single system without moving parts. Corrosion protective coatings are used throughout the unit. However, the welding of the joints unavoidably destroys the coating at these points. They are metallized with pure zinc after fabrication to restore this vital protection and ensure trouble-free operation.

Before welds are metallized they are thoroughly cleaned. The evaporator assembly, consisting of the evaporator compartment and attached steel piping, comes to the metallizing operation badly oxi-

dized. This is caused by heat applied in the process of brazing the steel freezing coils to the evaporator shelf. In order to remove this scale the assembly is carried by conveyor to a sandblasting room for cleaning. Then, still on the conveyor, it is routed through the spray booth for zinc metallizing. It takes only two operators to handle this work.

"Tack-weld" Pipes Together

It is important at certain points in this gas unit that efficient heat exchange take place. To accomplish this a pipe carrying a warm solution is brought in contact with one carrying a cool liquid. However, since only the ridges of the

Sprayed aluminum fills in voids left by capillary action.

pipes touch each other, it is necessary to provide extra surface for efficient conductivity.

The procedure is to simply "tack" weld the pipes together. The operator then aluminum sprays the "valleys" between them to build up an effective heat transfer "bridge."

"Touches-up" Work

In another part of this same department they find a third use for their metallizing guns. This is in touch-up spraying of aluminum on the evaporator coils. These steel coils are aluminum brazed to the top and bottom of the evaporator compartment.

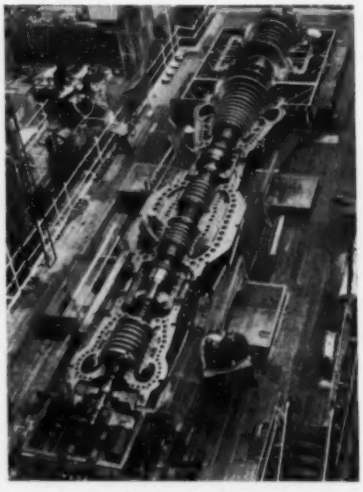
At the same time the brazing takes place the molten alloy flows by capillary attraction around the steel freezing coils. This is de-

sirable both for corrosion protection and good heat transfer. In some instances gaps are left where the capillary action isn't sufficient to cover the pipe entirely. Such units are routed to another spray booth where these voids are covered.

Power:

Giant 2,800,000-lb turbine involved in big "swap."

A massive, automatic extraction steam turbine is being assembled for tests at General Electric's large steam turbine-generator department in Schenectady, N. Y. It will handle 2,800,000-lb of steam per hour, and is involved in one of industrial history's biggest "swaps."



The huge steam turbine handles 28,000,000-lb of steam an hour.

This turbine and its connected generator will be installed in the Linden, N. J., power plant of the Public Service Electric and Gas Co., New Jersey. Steam, once it has already done efficient work in generating electric power, will be piped nearly a mile to the Esso Standard Oil Co.'s Bayway Refinery. Here the steam will be used in the processing of petroleum products. In return, the refinery will pipe back residual oil to fuel the generating station's boilers.

Coating:

Electro spray pays-off for small firm.

Small, as well as large, plants are turning to modern finishing methods to help keep mounting manufacturing costs in line.

Melrose Lighting Co., Philadelphia, produces industrial and commercial fluorescent lighting fixtures. They're certainly not the largest in the field, with only 25 employees.

Lunch-time Changeover

One day last December they stopped their hand spray operation at lunch-time. At one o'clock the line was operating with a Ransburg No. 2 electrostatic spray process taking over the painting job. Without interfering with daily production, a loop was built during off hours, by-passing the conveyor line. An overhead reciprocating disk atomizer was installed in the center of the loop. During lunch time shut-down, the 8-ft loop was cut into the conveyor; connections were made, and everything was ready to go.

Few Parts Hand Sprayed

Reflectors, louvres, irregular shaped ends, and several other parts are painted electrostatically. A few of the larger parts are still hand sprayed in a water-wash booth, and hand touch-up is required on louvres. Parts such as 13 x 48-in. reflectors hang individually on a workholder; some smaller parts, such as fixture ends, are grouped on workholders.

Melrose formerly used three spraymen working 8-hour shifts. They still have three painters. However, only about a quarter of their time is spent in the spray booth. When not needed for hand spraying, they do other work in the plant, machine shop, or in welding.

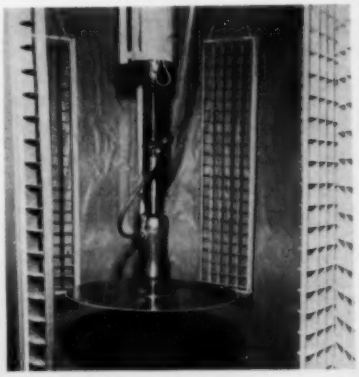
Two Men Touch-up

Formerly, when louvres were entirely hand sprayed, they painted 70 units per hour with two men. Now, with electrostatic, they get

over 200 per hour, using two men for touch-up which is necessary in the recessed areas.

Production on the fixture end parts jumped 400-pct. Formerly, ends were hand sprayed 12 to a rack. They were painted on one side, turned and painted on the other. They used to get only 400 pieces painted per hour. Now, they average 2000 an hour. Quality of the work is reported as improved too. When rack painted, they couldn't get the uniformity and finish which they get now. Under the present set-up, the ends are hung 6 to a workholder on 18-in. centers. As these parts pass around the reciprocating disk in the conveyor loop, an indexer in the loop center turns the workholder. Both sides are coated in a single operation.

At Melrose, the 281-ft conveyor is operated at speeds ranging from 5 to 14-fpm, depending upon the parts being painted. After coating, parts pass into a gas-fired induction oven. Here they bake out at 300° F. Depending upon conveyor speed, baking time ranges from 5 to 11 minutes.



Disk electrostatically paints the lighting louvers.

According to the operators, they're using a better grade of enamel now; however, with the efficiencies made possible with electro-spray, the painting cost per piece is less.

Packaging:

Wrapping huge electrode provides protection.

A 1¼-ton graphite electrode 8-ft long and 2-ft in diameter presents some obvious and formidable packaging problems. They've been neatly solved, though, in the first phase of a product-wide "new look" in industrial packaging at National Carbon Co., a division of Union Carbide and Carbon Corp.

End-chipping Feared

Huge electrodes present their own peculiar shipping requirements. Although very large in appearance, and inherently fairly rugged, each electrode has a precisely machined, threaded socket in each end face. Connecting pins are screwed into these when electrodes are joined together in the steel mill. The nudge of a lift

The man with the shield

During pouring, the future of a mill roll hangs in the balance. Its quality is wholly dependent, for the moment, upon the skill and experience of the pouring crew. All the metallurgy, all the hours of pattern making and painstaking mold preparation, all this rests on the shoulders of the man with the shield and the flawless execution of the orders he gives as he watches the molten metal swirl up from the bottom of the mold.

Mack-Hemp's pouring crews rank among the country's top foundrymen. Their ability is reflected in the quality of Mack-Hemp rolls, a quality that has been unmatched for more than one hundred and thirty years...an important reason why *you get more tonnage from the rolls with the Striped Red Wabblers.*

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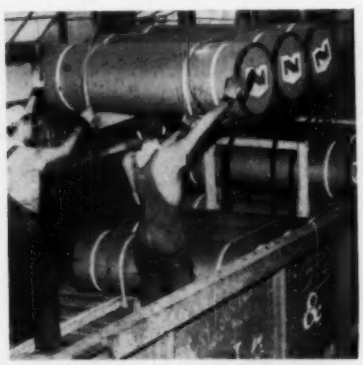
truck or a casual crane lift could chip the end of the electrode and cause a poor joint. Consequent poor electrode performance in the electric arc furnace would then result.

The problem is solved by taping to each end of the electrode, as it enters the shipping floor, a "cap" made of ½-in. celotex material. A special jig makes it possible to apply the two caps simultaneously.

End Cap Is Floor Pad

To make the package more functional, the end cap serves as a useful floor pad. This protects one end of the electrode when the other is hoisted by crane as the electrode starts its trip to the top of the furnace. Comments from steel industry executives praise the end cap program and its beneficial results in preserving electrode quality up to the point of use. As a totally unanticipated plus, customers are reporting many ingenious secondary uses for the end caps.



Protective end caps on electrodes prevent shipping damage.

To date, 12 to 24-in. diam graphite electrodes are being shipped with protective end caps. Smaller sizes, from 3-in. diam up, are shipped in quantity on strapped pallets. Here again, the new packaging design and trade mark are used on the corrugated wrappers. These provide product identification and "billboard-type" advertising, as well as protection during shipment and handling.

With electrode products carefully "wrapped up," attention is

now turning to other National Carbon Co. products. Shipping pallets of electrolytic anodes and carbon brick for furnace and chemical tank linings are now wrapped in a colorful corrugated protective covering as the next step. Eventually the bold reds and blues will find their way onto the company's complete line of carbon and graphite products.

Finishing:

Buff-Deburr process avoids older methods.

For years there have been some changes in methods employed to buff and deburr metal parts. However, they usually involved widely varying buffs and compounds, complex ventilating systems and a high ratio manpower to production. Sometimes, they still resulted in inconsistent finishing quality.

Now comes a change in methods for finishing brass, zinc-base and aluminum die-cast parts preparatory to plating. It eliminates older hand and automatic buffing methods.

Uses a Special Compound

The process uses a special-formula compound. It produces normally good buffed surfaces and fine luster, reports its developers. The system finishes a multiple mounting of parts in a single, automatically timed operation.

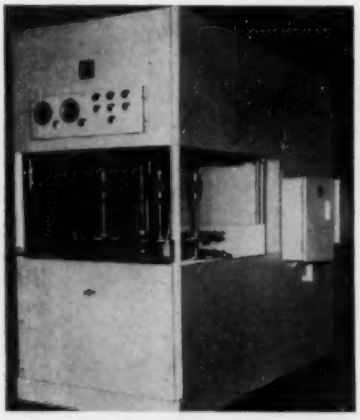
Advantages of the new method strike at several costly phases of conventional buffing methods. It eliminates elaborate blowers and exhaust-ventilating systems. Dust-free and fume-free, it does away with occupational hazards accompanying present buffing operations.

The new method also saves buffing material costs, states a report by the Grav-i-Flo Corp., Sturgis, Mich., its developers. Unusually shaped, difficult to process parts are finished in a single operation with the method. One compound is used for all part shapes and sizes.

In addition to running a number of like parts in a single setup, groups of as many as four different parts may be run simultaneously. A high degree of finish control can also be maintained.

Occupies Less Floor Space

Operating cycles vary in time from four to 16 minutes. A newly designed fixture for the machine permits locking or unlocking parts on the fixture with a single turn of a cam.



Spin-finish unit handles aluminum, zinc-base and brass parts.

The process' greatest economies, according to the manufacturer, result from its use on complex parts which formerly required equipment and labor for several buffing operations. However, in plant floor space alone, it saves money with elimination of large and complicated buffing setups.

Handling:

Short of storage space? Dig into the ground!

When in-plant storage space could not be expanded upward or outward because of overhead crane clearance requirements and floor space limitations, National Supply Co. solved the problem by digging into the ground. This achieved 40-pct increases in several locations in its plant in Ambridge, Pa.

More than 120,000 cu ft of ad-

ditional space was provided for seamless pipe in four storage areas where concrete-lined pits five feet deep increased piling height to 13½-ft. Similar expansion of a fifth and sixth area is in the planning stage. Increases in the four completed storage areas range from 16,000 cu ft to 58,000 cu ft below floor level.

Handling Methods Unaffected

Pit storage was the best solution of the storage problem from the standpoints of both cost and efficiency. The enlarged storage areas are as compact as before and thus permit increased production efficiency without plant expansion and without affecting handling

One answer to space problems is expansion downward.

methods. Separation of various types and sizes of oil well drill pipe, casing, tubing, and other pipe is provided conventionally by posts which are spaced to mark off 8 x 12-ft areas.

Safety provisions include a pipe fence around the pit in addition to the curbs at floor level and yellow tops on the posts.

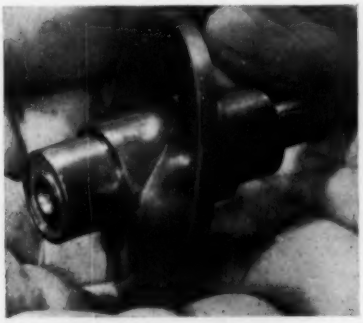
Materials:

Nylon molding powders show high wear resistance.

High wear resistance, low dry running friction, high dimensional stability, and exceptional molding qualities resulted in the selection of new molybdenum disulphide filled nylon molded parts for a new series of aircraft fuel pumps.

The pumps are manufactured by William R. Whittaker Co., Ltd., Los Angeles, Calif.

The new nylon powder, distributed by National Polymer Products, Inc., Reading, Pa., forms eleven parts in the pump. These include: the main rotor, and O-ring shaft seal, two D section shuttle seals, a keystone section wear pad bearing against the shuttle, four roller shuttle seals, and two shuttle sleeve bearings.



This main pump rotor is molded of nylon powder.

Heart of the pumping action is the rotor with a shaft of cast aluminum. The material is firmly applied to the perforated shaft by high pressure injection molding.

The pump manufacturer reports that the powder's low coefficient of linear expansion and minimum distortion following molding permits successful molding of the rotor. This would otherwise require machining to required tolerances.

Work At —65°F or 110°F

Miniature positive displacement pumps are designed to handle fuel at temperatures from —65°F to 110°F. Maximum pressure in the pumps is 200-psi, but experiments show that the material can be safely used in pumps carrying 1300-psi. The pumps run dry for prolonged periods after a fuel cell is dry. After 100 hours dry run, the parts showed no discernible wear due to their low coefficient of friction and wear resistance.

The molded parts are used in contact with anodized aluminum and showed no tendency to wear these surfaces.

Plastics:

Irradiated polyethylene fabricated into parts.

Plastics parts fabricated from irradiated carbon-black filled polyethylene are being produced experimentally by General Electric's Chemical Development Dept., Pittsfield, Mass.

Black, Tough and Flexible

The new material is a black, tough, flexible plastic. Derived from conventional high pressure polyethylene, it includes some new physical properties (very high heat and chemical resistance).

Yield strength at low temperature for the product is said to be double that of polyethylene. Creep

Parts are molded from vulcanized reinforced polyethylene.

deformation is reduced to approximately 10 pt of the value obtained for polyethylene.

Due to its cross-linked structure, the material can reportedly be carried to its decomposition temperature without melting. At 300°F it retains a tensile strength of 500 psi.

Demonstrates Heat Stability

Its heat stability has been demonstrated in long-term exposure tests in hot air and boiling water. Other significant properties cited are chemical resistance, resistance to inorganic acids, and elimination of stress corrosion cracking.

Due to its high carbon-black loading, the reinforced, irradiated polyethylene is electrically con-

ductive. General Electric reports it is presently test marketing a modification of the material as semi-conductor tape in shielded power cable. Preliminary evaluations are said to show excellent promise for this application.

In tape form, this material is also sold by the company.

The tape is a special electrical grade of polyethylene which is rendered non-melting by electron irradiation.

Refractories:

Development simplifies suspending insulating wall.

Until now, the suspending of insulating wall and arch tiles had been considered somewhat complicated. This was due to the fact that very few manufacturers were able to make tile shapes. Most refractory companies form and burn "biscuits." The desired brick shape is then sawed or ground from these biscuits.

Notches or grooves that were required in the tiles to accommodate the hanger had to be sawed or drilled. The refractories, being very abrasive, soon cut the hardest of tools.

Arch Employs Stainless

The maximum size of the tiles that most factories can grind from the biscuits is 3 x 4½ x 9-in., according to the Geo. P. Reintjes Co., Kansas City, Mo., developers of a suspended insulating refractory arch. This employs a method of using a stainless steel supporting clip, one end of which is impaled between a pair of bricks. The other end of this support is so designed as to hang over a rod much the same as clothes are hung on a line.

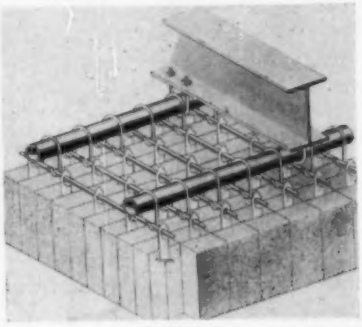
The opposing faces of the bricks are dipped in air-setting high temperature bonding cement before impaling the clips and then hung in pairs on pre-spaced rods. The clips extend beyond the refractories and are of sufficient length so that insulation of suitable thickness can be applied. The supporting rods in turn are supported from tubing on approximately 18-in. centers.

Suspended insulating refractory walls developed by the company are similarly supported. The bottom row of the tiles rest on the horizontal leg of an angle which has been previously attached to the vertical column. Rods at suitable intervals are fastened to these angles. The wall tiles are then laid in a manner similar to the building of gravity walls.

Insulation Readily Applies

Stainless steel anchoring supports are hooked over the rods. Their inner ends are impaled in the brick. The sectional suspending of the wall is accomplished by spacing the supporting angles 2 to 4-ft apart, and having offset expansion joints occurring at the support angles.

With this design the vertical supports, with exception of the impaled stainless steel anchors, are located outside of and spaced away from the refractories.



Insulating brick is cemented on a suspension clip in advance.

Insulation, either plastic or block, can be readily applied to the outside of the wall.

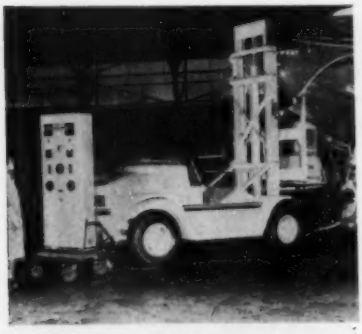
By using 3-in. brick, standard insulation blocks of 6-in. width can be installed without cutting. This applies to both wall and arch.

Inspection:

Fork truck maneuvers x-ray inspection head.

Using a fork truck to maneuver an x-ray head into position speeds up inspection of aircraft at Northwest Orient Airlines overhaul depot in St. Paul, Minn. A Clark-

Ross fork truck lifts the General Electric x-ray unit into positions that would ordinarily be inaccessible without disassembly of parts to be inspected or special scaffolding.



Fork truck mounting makes the x-ray unit highly mobile.

The fork truck provides a steady platform for the x-ray unit at any point below or around the plane. Radiographs are made of nose wheel strut pistons, prop blades, and welds in other heavy sections simply by moving the fork truck close to the plane and raising the forks until the head can be aimed at the section to be inspected.

X-ray, Cooler On Dolly

The x-ray head and its oil cooler are mounted on a special dolly equipped with tang slots for the truck's forks. The fork-lift carries the unit from plane to plane in the overhaul hanger and is used for other handling chores when not in use for x-ray inspections.

Methods:

Factory layout planners conserve floor space.

Not the least among important factors in efficient factory layout is careful study of space requirements. This is done to properly accommodate production equipment; also to provide such room as may be needed for storage, aisles and handling. All machine tools usually are located to provide the shortest practical distance of travel for material being

processed. Where work is standard, definite predetermined lines of travel for the work are established.

Cuts Handling Costs

Where such a study is made with sufficient care, machine placement reduces the amount and cost of materials handling. They also cut down work processing time. In some instances (where floor space is at a premium) careful preliminary planning will allow floor space to be saved.

One arrangement consists in staggering a battery of units so the area they require is reduced considerably. Yet one end of each machine is readily accessible from a specific straight aisle. An instance of such an arrangement is found in the plant of American Saw & Mfg. Co., East Longmeadow, Mass.

Here, a battery of five high-production, horizontal-spindle surface grinders are employed for grinding annealed tool steel ground flat stock, on a high-production schedule. The fine-finish flat stock produced by the company

This horizontal-spindle surface grinder is strategically placed.

is held to a thickness tolerance within 0.001-in. The finished product is employed for making fixtures, templates, gages and similar items, being furnished to toolmakers for this purpose.

Handling:

Presto! Flat conveyor changes into cleated belt.

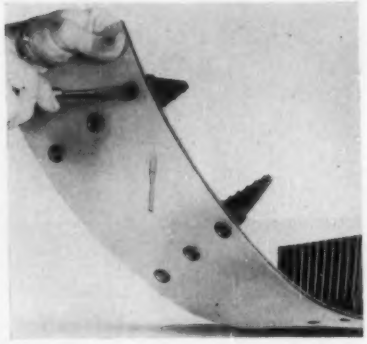
Recently developed, a molded neoprene screw-on cleat converts any conveyor or elevator belt into a cleated-belt. Nothing more than a punch and a screw-driver is needed for the conversion.

The neoprene cleats are attached to the belt by flat head machine screws and special countersunk washers. These are secured to threaded metal inserts vulcanized in the base of the cleat. Inserts are imbedded in concave cups. When the screw is tightened against the washer, it pulls the belt into the cup. Both screw-head and washer sink below the belt's surface, where they cannot contact the pulley.

Width Changes Easily

One of the advantages of this unique cleat design is the ease of

changing width and height of the cleats and the transfer of cleats to replacement belts, according to E. I. du Pont de Nemours & Co., Wilmington, Del.



A simple screwdriver converts the belt to a cleated one.

Molded of long-life, high tensile neoprene, the cleats are resistant to oil, heat, mild acids, and weather conditions.

Welding:

Stud welding cuts repair bill on coke quench cars.

A new use of the stud welding technique, devised by maintenance shop supervisors at U. S. Steel's Fairless, Pa. works, is resulting in significant savings for the plant.

Some 243 times in a 24-hour period, two coke quenching cars on continuous duty at Fairless are loaded with 12½-ton of flaming coke. They then speed to a quenching tower where cascades of water plummet the temperature of the cargo from its 2100°F.

The finished product is then dumped for conveying to the coke stock pile, or else transported directly to the blast furnaces.

Car Removal A Problem

Until recent months, a major problem at Fairless was the number of times the coke quenching cars had to be removed from duty for repair. Every 15 or 16 weeks, they needed a complete change of steel floor plates.

Damage to the car's floor plates was caused by abrasive action of tons of coke smashing against the floor surface, corrosive action created during quenching, and thermal shock of the high temperature coke suddenly being cooled.

Sixteen ¾-in. plates, which had been installed by drilling and countersinking holes and inserting ¾ x 2-in. countersunk head bolts, were being torn from the supporting mounts of the car itself.

In most instances, the bolts had either been sheared away or were eroded by the acid action. The consequent lack of fasteners caused the plates to warp and pull loose.

With the bolt-down plate method, new plates had to be transferred from one shop to another because of the variety of make ready operations. Several plates could be gang-drilled, but each countersunk hole had to be individually made. Plates were flame cut to

size in the structural shop, then taken to the machine shop for drilling and countersinking.

The final step was to ship them to the coke works as "spares" so the car's time off the job could be reduced.

Replace Steel Plates

The maintenance department's first experiments were to replace AR steel plates with plates made of T-1 steel. The latter is developed by USS.

The length of floor plate use between repairs was immeasurably increased, but not enough to realize appreciable savings in shop and operating costs.

The steel's quality was not the determinant factor in the maintenance problem; the planning department then turned its attention to the fastening method. Improved techniques of countersinking holes were considered, tried and discarded. By January of this year, the planning department felt the solution might lie in stud welding the plates to the car.

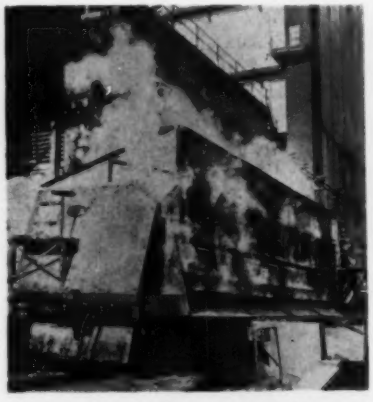
Study Stud Weld Possibility

K S M Products, Inc., a manufacturer of arc welding studs in nearby Merchantville, N. J., was

Car's underside shows location of studs.

asked to have its engineering department work with Fairless personnel in exploiting the stud welding possibilities for this application.

Laboratory experiments indicated stud welding was practicable. The weld developed full strength. In Tensile tests, the failure occurred in the steel at 80,000 psi.



Hot coke falling into this car tears and wears away plates.

In late January, the application was first used. A coke quenching car had its two center floor plates replaced and re-fastened by stud welding. The method was a success.

Coke works maintenance reported only six studs in the test

car worked loose. On plates fastened by the former method, six times that number of bolts were lost in the same period. The plates would have been replaced at least once, says USS.

All Plates Stud-welded

Nearing completion is a reconditioned coke quenching car in which the maintenance department is using the stud welding process on all floor plates.

The car will be equipped with mild steel plates, based on the theory that the better fastening will develop enough extra life in the less specialized steel.

Steelmaking:

Trend to bigger open hearths seen.

Open hearth steelmaking furnaces, which last year accounted for 90-pct of the nation's steel production are getting bigger and better, according to a study of 29 companies, made by the American Iron and Steel Institute.

The companies' combined open hearth capacity is 107-million net tons annually, or 95-pct of the total open hearth capacity in this country.

Fewer Small Furnaces

The study revealed that the companies have 204 open hearth furnaces capable of heats of more than 225-tons each, compared with only 30 such giants in 1947. Conversely, the number of small furnaces has declined. In 1947 there were 39 furnaces tapping less than 100-tons per heat. Now there are only five.

Economy is the main reason behind the increase in furnace sizes, primarily because larger furnaces, in proportion to capacity, cost less to build and maintain than smaller ones.

Production Increases

The production rate for each group of furnaces has also increased, in some cases more than ten tons per hour per 1000-sq ft of hearth area.

The trend toward larger furnaces is evident at all points along the scale of furnace size. Furnaces with heats of 100 to 124-tons each have decreased in number from 118 in 1947 to a scant 38 in the first quarter of 1956. Just as striking is the drop in the number of furnaces pouring heats of 125 to 149 tons—from 197 to 111 in the nine-year period. Over this same span of time, the larger furnaces with heats of 150 to 225-tons have increased in number from 229 to 313. Of the 204 furnaces reported in 1956 as over 225-tons in capacity, 146 were over 250-tons in heat size, and 27 were over 400-tons.

In 1945, when open hearth capacity was 84.1-million-tons, there were 990 furnaces, and now 911 furnaces are capable of producing 112.3-million-tons.

The first commercially successful furnace had the capacity of only five-ton per heat. Today's largest has 550-ton capacity per heat.

FREE AIDS

New Technical Literature:

Catalogs and Bulletins

Radiography

Gamma radiography is the subject matter of a new 18-page booklet. It explains how one company's nuclear systems division has produced a versatile line of remote handling equipment for safe exposure of very strong gamma sources. This rapid, low-cost, industrial radiography equipment is used for inspection of castings, weldments and fabricated parts. *Nuclear Systems Div., The Budd Co.*

For free copy circle No. 1 on postcard, p. 169

Press application

Package applications modernize presses and similar machinery with a pneumatic clutch and brake. They are illustrated and detailed in a new bulletin. This contains: data on how to select the proper application for a press, dimension and flywheel inertia information in table form, photographs of a typical equipped press, detailed price tables. *Fawick Corp.*

For free copy circle No. 2 on postcard, p. 169

Abrasives

Blast cleaning adbrasives, their characteristics, application and selection are explained in a new dozen-page manual. It describes importance of selecting proper type and size abrasives and covers properties. *Pangborn Corp.*

For free copy circle No. 3 on postcard, p. 169

Computers

The use of digital computers in automatic manufacturing and processing, data and materials handling, and the implementation of clerical business operations is increasing every day. A booklet now available acts as a primer on digital computation. It helps show important rudiments upon which digital machine computation is based. *Computer Control Co., Inc.*

For free copy circle No. 4 on postcard, p. 169

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 169.

Multi-action machine

Simultaneous milling of two surfaces, drilling, rough boring and reaming are performed on 27 parts per hour with a new machine. Literature now available tells how after milling, three holes are drilled in one side of the parts. Then, the cored opening at the neck of the case is rough bored on the opposite side, simultaneously. The table advances to the final station where three holes are reamed by same six spindle head used in drilling these three holes. All operations are automatic between load and unload. All clamping, movements and feeds are hydraulically controlled. *Motch & Merryweather Machinery Co.*

For free copy circle No. 5 on postcard, p. 169

Photocopy units

An eight-page brochure describes diazotype copying machines used to eliminate up to 90 pct of the writing in preparation of production and assembly orders. It shows how a translucent operations sheet is converted into a parts production order by use of a low cost copying machine, eliminating rewriting and proofreading of descriptions, specifications, and work instructions. Any number of copies can be made on white or color-tinted paper or cardstock, it states. *Charles Bruning Co.*

For free copy circle No. 6 on postcard, p. 169

Zinc coating

Inorganic zinc coating for structural steel, tank interiors, and exteriors, towers and equipment is resistant to weathering, abrasion, salt and fresh water, solvents and petroleum products. So states a new four-page brochure. One coat affords same physical and cathodic protection as galvanizing, and lasts up to 15 years, it states. It can be applied by spray before or after construction. *Amercoat Corp.*

For free copy circle No. 7 on postcard, p. 169

Die sets

Die sets and accessories are the subjects of a 76-page catalog just published. 56-page technical section and a 20-page net price book are printed separately and bound together in such a way that they can be read simultaneously. Helpful hints on how to select and use die springs and how to save on steel specials, and specially-compiled load comparison tables for chrome-vanadium springs are featured. *The Producto Machine Co.*

For free copy circle No. 8 on postcard, p. 169

Punch press

Written matter offers information on a 2-ton punch press with a heavy-duty clutch. The clutch contains an oversize, sliding-key-type clutch dog encased by a strong steel collar which removes the driving load from the crankshaft keyway. The design was originally perfected for the manufacturer's 8-ton punch press, adopted as standard on its 5-ton model after a full year of testing and will now become standard equipment on the 2-ton press. *Benchmaster Mfg. Co.*

For free copy circle No. 9 on postcard, p. 169

Lubrication

Automatic and semi-automatic centralized lubrication systems for small machines are illustrated in a 24-page bulletin. It describes a company's line of cyclic and "one-shot" lubricators and discusses factors to be considered in selecting the proper lubricator for a specific machine. *Bijur Lubrication Corp.*

For free copy circle No. 10 on postcard, p. 169

FREE TECHNICAL LITERATURE

Carbide tools

Precision solid carbide tools are detailed in a catalog just released. It contains new tools and more useful information than any previous edition. Within the catalog's 100 pages are sections on burrs, boring bits, boring tools, countersinks, center laps, cutters, drills, grinding tools, end mills, radius mills, routers, reamers, and reference data and tables. Included is a new 28-page price list. *The Atrax Co.*

For free copy circle No. 11 on postcard, p. 169

Valves

Twenty-eight page catalog shows 100 pct pipe area, venturi, round port, and diamond port lubricated plug valves in a variety of metals for 150-lb steamworking pressure, 200-lb oil-water-gas, and ASA 150 and 300-lb classes. Complete with engineering dimensions, this catalog also shows different types of power operators for valves, in addition to complete lines of lever operated, and worm and gear operated valves. *Homestead Valve Mfg Co.*

For free copy circle No. 12 on postcard, p. 169

Battery charge

How a fully automatic battery charge control enables new lighting units to afford greater protection against failures with less maintenance, is outlined in a folder. It describes how manual switching, which emergency lights usually require, has been eliminated in latest designs. The folder discusses how voltage-sending, temperature-compensated relays switch full-wave selenium rectifiers to high charge rates after emergencies. After batteries are recharged in a short time, it states, relays return the chargers to a trickle-rate for maintaining the batteries in readiness for the next emergency. In addition to photographs of the light guards and the battery which powers them, the folder contains an operation chart demonstrating reliability of the automatic charge control device. Other charts show beam coverage, light intensity and protection time. *Exide Industrial Div., The Electric Storage Battery Co.*

For free copy circle No. 13 on postcard, p. 169

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 166.

Automatic lathe

A fully automatic cycle for every basic turning requirement is an advantange of a new lathe, according to a bulletin just released. The machine incorporates features not found heretofore on any other lathe. Yet, it employs basic operating principles tried and proved on many production lines. The 24-page publication supplies information on the machine's control system, air-gage tracer mechanism and constant surface cutting speed control. An optional automation setup designed for completely mechanized workpiece handling is also described. *For free copy, write on company letterhead to Monarch Machine Tool Co., Sidney, Ohio.*

For free copy circle No. 14 on postcard

Conveyor

Literature on a live rail wheel conveyor tells how it can be used to move, store or unload almost any object with a smooth, flat bottom. It shows numerous illustrations of fixed and portable installations with descriptions. *The Alvey-Ferguson Co.*

For free copy circle No. 15 on postcard

Industrial lighting

"Prescribed Lighting Protects the Eyes of Industry," is a new 28-page booklet. It features sections on safety and visibility, uses of fluorescent, incandescent and mercury vapor lamps; lighting of other areas, maintenance, and condensed catalog data on fixtures. It lists 10 advantages to be gained from improved lighting. *Sylvania Electric Products Inc.*

For free copy circle No. 16 on postcard

Furnace equipment

Electrical equipment for arc furnaces is covered in a 16 page bulletin. It includes product information and features. Illustrations and information describe transformers, switchgear, control, and direct-current motors. *General Electric Co.*

For free copy circle No. 17 on postcard

Grinding

Grinding wheel specifications for tool and die steels are listed in a new booklet. It gives these facts arranged for ready reference in index form. Readers can quickly locate types of steel, and the recommended specification for grinding each. Tables, grinding specifications, cross references, information on steel suppliers and a new electronic formulation process are included. *Bay State Abrasive Products Co.*

For free copy circle No. 18 on postcard

Adhesive tapes

Pressure-sensitive tape uses are disclosed in a unique handbook just published. The colorful, informative publication features a four-way guide to tape selection. This enables prospective users to select tapes by government specification, the manufacturer's product number, tape type or by specific application within 134 industrial classifications. It describes masking tapes, waterproof cloth tapes in 13 colors; packaging and materials handling tapes; colored printable tapes; electrical and specialty tapes, and industrial adhesives. *Mystik Adhesive Products, Inc.*

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Containers

Deep-drawn and fabricated cases of aluminum, brass and steel are depicted in a 60-page catalog. Featured are drawn aluminum instrument cases for electronic and instrument manufacturers. Over 1400 deep-drawn cases are listed as available from stock. These units are produced from standard dies, eliminating tooling and special set-up charges, even on short runs. They have high-precision, seamless construction. *Zero Mfg. Co.*

For free copy circle No. 20 on postcard

Motor selector

Information on how to select ac motors for specific applications is included in a new 12-page booklet. Speed-frequency relationship, NEMA design classes, and torque characteristics are contained. Also listed are: NEMA current and torque values, frames selection tables, and dimension charts and mechanical modifications. Two pages are devoted to a pictorial glossary of motor enclosure terminology. *Reliance Electric & Engineering Co.*

For free copy circle No. 21 on postcard

X-ray microscope

Illustrated with micrographs, a catalog describes a new X-ray microscope. Included are: historical background, fundamental operation theory, and basic technical details. Listed are suggested applications in the broad fields of metallurgy, chemistry, textiles, and biology. *G. E. X-ray Dept.*

For free copy circle No. 22 on postcard

Adjustable counterbore

Two-bladed adjustable counterbores are covered in literature giving data and prices. The unit solves the problem of counterboring large diameters to precision tolerances and of holding specific diameters, even after numerous regrinds. It is successfully used in spot-facing or counterboring steel forgings, heat treated steels, cast iron, titanium, stainless steel, aluminum alloys, etc. Five sizes are now manufactured covering hole sizes from 1 to 4-in. od. *Robert H. Clark.*

For free copy circle No. 23 on postcard

Materials handlers

Hand hoists, lifts and plain and geared hand hoist trolleys are presented in a new catalog. This 44-page booklet contains, in addition to product information, an article on how to select the proper type hoisting equipment. *Yale & Towne Mfg. Co.*

For free copy circle No. 24 on postcard

Gray iron castings

Designers, engineers and purchasing agents of gray iron castings are now in a position to secure their requirements of gray iron castings more intelligently by following the suggestions of a new booklet just issued. The eight-page leaflet spells-out in plain language specific information that should be supplied with an order or request for quotation for castinga. *Gray Iron Founders' Society.*

For free copy circle No. 25 on postcard

Business

One and a half million new businesses of all sizes will be created in America by 1976. So predicts a new booklet, "The Story of Business: Large and Small." "What we have in this country is not big business and little business," the booklet says, "but a business establishment in the same sense that we have a military establishment and an educational establishment. Each is composed of units of various and varying sizes, shaped and adapted to the need." *E. I. du Pont de Nemours, & Co.*

For free copy circle No. 26 on postcard

Submicron filters

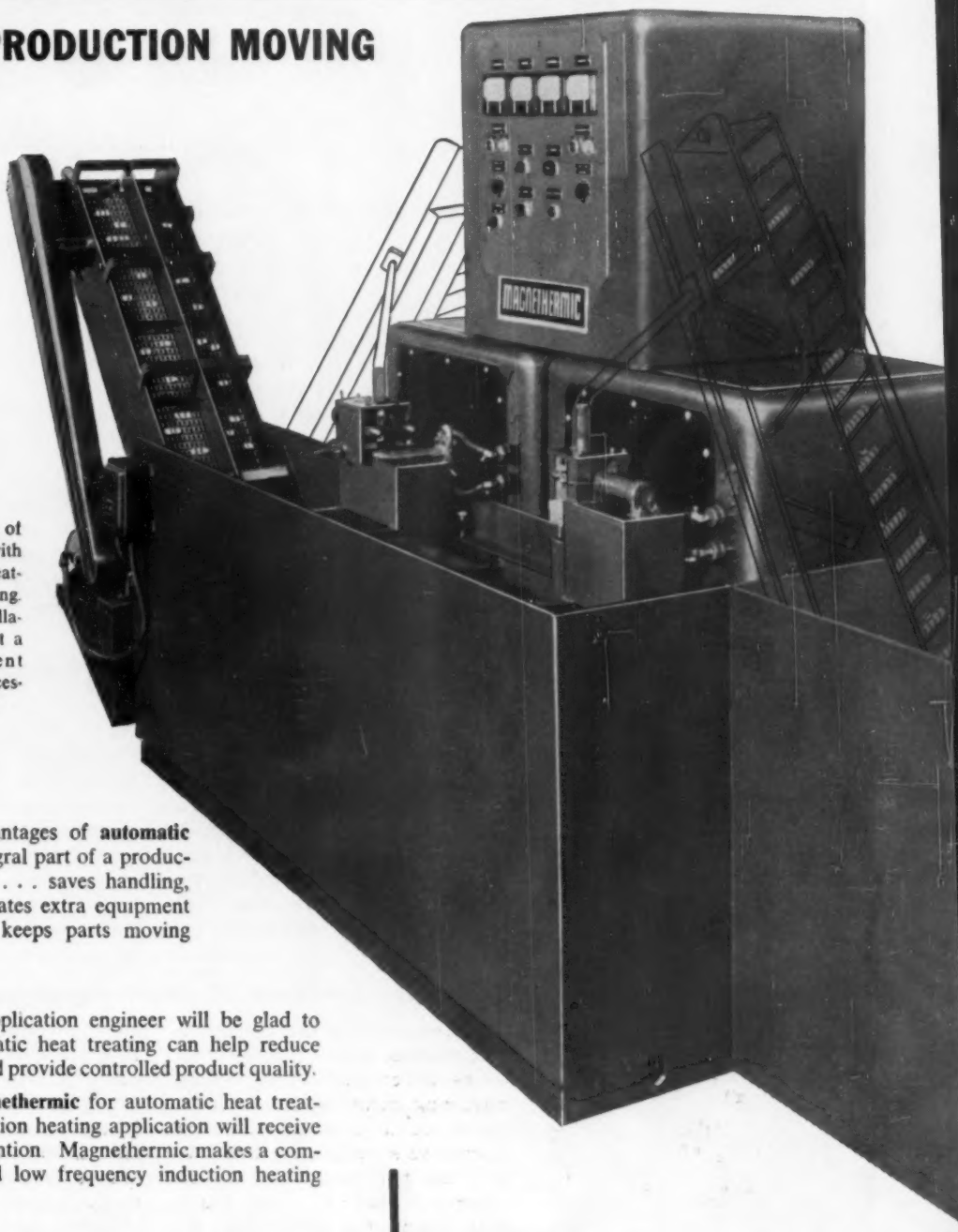
New bulletin describes how a submicron filter works and reveals how ultra-high purity water is possible in production quantities which formerly was attained only in batch quantities in the laboratory. The filter element, because of its construction, is suited for the analysis of impurities retained on the filter when so desired. Other important information and mechanical specifications of the unit is told. *Barnstead Still & Demineralizer Co.*

For free copy circle No. 27 on postcard

AUTOMATIC HEAT TREATING

with Magnethermic Induction Heaters

KEEPS PRODUCTION MOVING



Here is another example of automatic heat treating with Magnethermic Induction Heaters and automatic feeding. This Magnethermic installation keeps parts moving at a steady rate to subsequent operations. Loading is necessary only once per shift.

You know the advantages of **automatic heat treating** as an integral part of a production or machining line . . . saves handling, controls quality, eliminates extra equipment and, most important, keeps parts moving continuously.

A Magnethermic application engineer will be glad to show you how automatic heat treating can help reduce manufacturing costs and provide controlled product quality.

An inquiry to Magnethermic for automatic heat treating or any other induction heating application will receive prompt, intelligent attention. Magnethermic makes a complete line of high and low frequency induction heating equipment.

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INDUCTION HEATING EQUIPMENT

MAGNETHERMIC corporation

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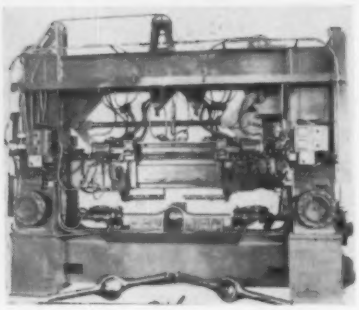
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 169 or 170.

Pneumatic tire fork lift truck boasts 8000-lb capacity

Power brakes, power steering and finger-tip directional control are standard on a new 8000-lb capacity, pneumatic tire, fork-lift truck. With four speeds in each direction, it travels 16½-mph forward and 16-mph reverse. Loaded, it climbs a 21-pct grade. Water, fuel and hydraulic filler caps are outside the engine for quick access. Major engine components are easily reached through hinged side louvers covering the engine. An engine hour meter, ammeter, oil pressure gage, fuel and temperature gages, ignition switch and starter button are all mounted in a panel on the steering column. A spool-type valve with built-in pressure relief controls the hydraulic system and provides lift speeds of 48-fpm empty and 42-fpm loaded. The axle-mounted, telescopic upright tilts four degrees forward and 12 backward. An automatic "tilt-lock" valve prevents upright drift. Length: 132-in. Width: 77-in. Turning radius: 134¾-in. Wheelbase: 86-in. A six-cylinder Continental gas engine powers it. *Clark Equipment Co.*

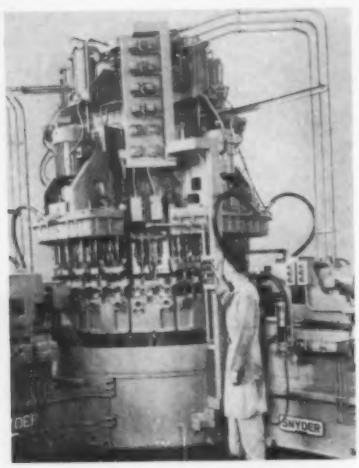
For more data circle No. 28 on postcard, p. 169



Arc welder simultaneously welds with four heads

An automatic submerged arc welder performs simultaneous welding with four platen-mounted heads. Designed primarily for welding transverse seams in automotive rear axle housings, the unit is adaptable to a variety of high production submerged arc welding applications. In use, two stampings are simultaneously clamped in the machine. An upper platen securely clamps the housing halves during the welding operation. It is suspended from the crown by toggle linkage, and moves through side-mounted guides. Upon completion, an automatic ejector loosens the housing from the fixture, permitting its removal. *Swift-Ohio Corp.*

For more data circle No. 29 on postcard, p. 169



Machine produces 331 steering gear ball nuts per hour

With 16-stations, a new center column machine boasts a heavy-duty, seven-sided column that resists high machining thrust loads. It drills, reams, countersinks, and chamfers automotive steering gear ball nuts at a net production rate of 331 pieces per hour. The unit has a 96-in. diam index table. With its control panel, it occupies a 24 x 26-ft floor space and is 13-ft high over-all. Weighing about 50,000-lb, the machine develops a total of 181-hp and delivers 150-gpm of coolant. Three SAE 5620, 2½-in. long steel ball nuts having a 1⅝ x 1⅞-in. round-cornered square section are clamped in each of the unit's 16 fixtures. The nuts, which have previously machined rack teeth in the blanks, are located in the fixtures from these rack teeth. Hydraulic clamping is provided for the parts. Large vertical thrust loads make the special heavy-duty center column necessary. They are imposed by two three-spindle, two nine spindle, one 12-spindle and one 18-spindle vertical heads that drill, flat-bottom drill and chamfer. *Snyder Tool & Engineering Co.*

For more data circle No. 30 on postcard, p. 169

Here's proof of Hi-Qua-Led's performance in ALCO seamless forged and rolled rings:

"Roughing cuts reduced by ½
. . . cutter costs by ⅓
. . . running time by 12¼ hours
. . . surface finish: greatly improved"

Tremendous savings in machining time and reduced tool costs are reported by our ring customers who have used ALCO's new Hi-Qua-Led Steel*. Here's what one customer reports:

"The leaded steel machined successfully using half the normal number of roughing cuts and at greatly increased speeds. Surface finish was greatly improved. Normal surface finish on 4140 steel was from 80 to 125 rms, while surface finish on the two test gears was from 40 to 60 rms. Total running time per gear was reduced by 12.18 hours. Cutter costs were reduced by approximately one-third."

Make the comparison right in your own shop. Let ALCO furnish you a trial lot of Hi-Qua-Led steel rings along with your usual grade. See the advantages it brings in faster machining, with less power, reduced tool wear. Hi-Qua-Led may be obtained in any size ALCO forged ring. For complete information contact your nearest ALCO Sales Office.

*Trade-mark Reg. applied for. Patent applied for on lead-addition method.

Other customer tests of Hi-Qua-Led's machinability are equally impressive:

- **41L37 — Brinell Hardness 290-330**

  Turning — Speed increased from 2¾ rpm to 6 rpm. Depth cut: from ⅛ in to 3/16 in. Machining time improved: 69 per cent.

  Teeth-Cutting — Tool life increased 1600 per cent. Tool wear decreased 95 per cent.

- **41L40 — Brinell Hardness 285-302**

  Turning — Speed increased from 17 rpm to 25 rpm. Machining time improved 47 per cent.

  Teeth-Cutting — Tool life increased 427 per cent. Tool wear decreased 77 per cent. Machining time improved: 41.2 per cent.

Your copy of "Facts on Leaded Steel for Seamless Forged and Rolled Rings," is waiting for you. Just write ALCO Products, Inc., P. O. Box 1065, Schenectady 1, New York.

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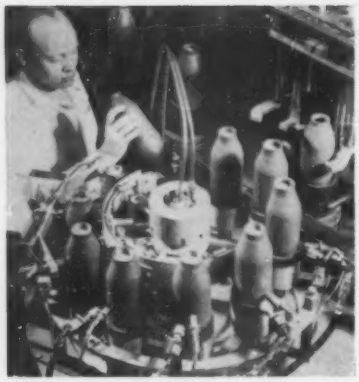


X-ray robot inspects rockets, decides if they are scrapped

An x-ray robot automatically inspects explosive charges in artillery rockets and marks defective ones. The robot's "eyes" are cadmium selenide crystals. These are sensitive to x-rays. When excited by these rays, they unleash the flow of large quantities of electric current. Newly-made rockets are transported on a conveyor to a circular inspection platform. In the platform's center is a conventional 250,000-v x-ray machine. This sends beams to the six inspection stations around the platform's rim. Each station has a cadmium selenide crystal. If the explosive charge is normal, it passes through. If not, a network combining the crystal, an electronic brain and a mechanical arm spot the flaw and decide if it's serious enough to reject. This combination either passes it through or marks it rejected. *X-Ray Dept., General Electric Co.*

For more data circle No. 31 on postcard, p. 169

Load cell scales feature electronic weighing operation

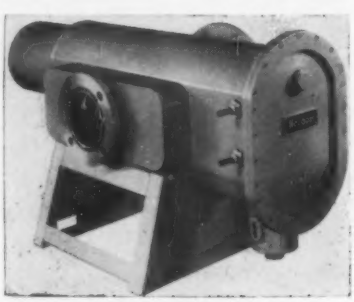
This load cell scale records and indicates weights electronically. It features high speed dial indication, flexibility in locating load bearing elements remote from the indicating head, and simplified installation. The latter is due to compact load cells and elimination of space consuming lever assemblies. Basically, the scales consist of two elements: (1) load cells with platform or load suspension unit, and (2) an electronically actuated servo-type indicating mechanism. When a load is placed on the scale, there is a slight compression of the steel column in each load cell. This is measured electrically and amplified into a signal that operates the servo-mechanism in the dial head. The signal can be readily transmitted to a dial head located wherever desired, at a distance from where the load is weighed. Tare and unit weights are applied by simple adjustment of control knobs. *Toledo Scale Co.*

For more data circle No. 32 on postcard, p. 169

Core rod steel saved by rod straightening machine

Foundry operators can use the same core rods and gaggers several times by using a core rod straightener and shear machine. This isn't all; it also reduces labor requirements for reclaiming them. The machine operates as fast as material can be fed into it. Two heavy alloy steel dies, one movable and the other stationary, straighten one rod at a time. The dies close as a contracting square upon the work; a blow delivered simultaneously from four sides straightens it. Big kinks in rods can be quickly removed first in the machine's banding jaws. One blow of the straightening dies afterward does the rest. Following straightening, rods can be sheared to desired length. Rods from $\frac{3}{8}$ to $2\frac{1}{2}$-in. diam can be straightened in the dies; rods up to $1\frac{1}{2}$-in. diam can be sheared. A special gagger-forming attachment is available as optional equipment. Compressed air operates it. *Wheelabrator Corp.*

For more data circle No. 33 on postcard, p. 169



Six standard size pumps produce high vacuum fast

Available in six standard sizes, new, fast, Roots-type vacuum pumps cover maximum speed ranges from 92 to 4900 cfm. Basic mechanism of these pumps is a pair of figure-eight-shaped rotors which counter-rotate in the pump chamber. These finely machined rotary pistons never touch one another or the pump casting. Consequently, no oil sealing in the pump chamber is required. They feature quiet, vibration-free operation and low power consumption. The 39 x 20 x 22-in. size has a throughput of 10,400 micron-cfm at 10 microns, for easy handling of gas bursts. *Rochester Div., Consolidated Electrodynamics Corp.*

For more data circle No. 34 on postcard, p. 169

Towing tractor

With 8000 lbs. maximum starting drawbar pull, a towing tractor features a low silhouette free of protruding accessories and a fluid coupling as standard equipment. It measures only 56½-in. to top of steering wheel. With overall length of 107-in. and width of 69-in., it turns on a 146-in. radius. Powered by a six-cylinder Chrysler gas engine of 230 cu in. displacement, the tractor provides smooth starts

under load through its fluid coupling drive. Four wheel brakes, automatic coupler and two recessed, sealed-beam headlights are standard. A heavy-duty, helical-gear, synchromesh transmission provides four speeds forward and one reverse. Final reduction is accomplished directly on each drive wheel through planetary gearing. Maximum forward speed is governed at 16-mph. *Clark Equipment Co.*

For more data circle No. 35 on postcard, p. 169

Molybdenum pellets

Molybdenum pellets of high purity and high density are available for vacuum melting processes used in the manufacture of critical high-temperature alloys. Of an easy-to-handle size, approximately 1-in. in diameter by ½-in. high, the pellets are approximately 99.85 pct pure molybdenum. They have a density of 7.0 grams per cu cm, and a gas content in the range of 300 ppm. This is below the 400 ppm considered suitable for vacuum melting. Standard package for the pellets is a 3½-gal lacquered pail, with a clamped lid sealed with a rubber gasket, containing 80-lb of pellets. *Tungsten and Chemical Div., Sylvania Electric Products, Inc.*

For more data circle No. 36 on postcard, p. 169

Announcement!

...Cleveland

now offers a complete line of

Top Quality

Socket Screws

Our line of socket screws has been expanded to include all standard socket items, in all catalog sizes, made to Cleveland's extra high standards of quality.

- Socket Head Cap Screws
- Socket Set Screws
- Flat Head Socket Cap Screws
- Button Head Socket Cap Screws
- Shoulder Screws
- N.P.T.F. Pressure Plugs
- Socket Screw Keys
- Precision Dowel Pins

Complete stocks of Cleveland Socket Screw Products are available for immediate shipment.

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The Iron Age SUMMARY . . .

Plate supply crisis intensifying cry for voluntary allocations . . . But mills and some top government people are against them . . . Automotive comeback . . . Scrap leveling

Plate Crisis . . . The growing crisis in steel plate supply is generating more pressure for some form of voluntary allocation. But counter pressure against allocations is coming from steel mills and some top policymakers in the Eisenhower Administration.

Meanwhile, the pressure for higher steel prices mounted still further this week following a 9½¢ per lb increase in the price of nickel. Stainless steel producers will be hard put to absorb this price advance. Odds favor a boost in stainless prices after turn of the year.

The tug-of-war in plate is an outgrowth of the Suez Canal shutdown and the cutting of a major oil pipeline. The resulting European oil shortage calls for a step-up in oil tanker construction, repair, and de-mothballing by the U. S. to make up the deficit.

Steel mills resent backstage government pressure to force "voluntary" channeling of plate and structurals to shipbuilding. They're already under the gun to sustain the freight car building program. And some old-time customers in other fields are taking the consequences.

Automotive Comeback . . . While more plate and structural capacity is on the way, production of these two products will suffer until the new mills are in place. A large Eastern producer will curtail sheared plate production by 40 pct while a new mill is being installed.

Steel demand from other industries is holding steady—or mounting. Auto producers are beginning to see daylight. Their new cars have taken the public's fancy. And first quarter steel requirements are beginning to rise.

Latest auto industry estimates on 1957 production and sales are figured to be on the conservative side. Some off-the-record predictions run as high as 7.2 million passenger cars compared with the less-than-7-million forecast. Observers point out it's a lot more comfortable to revise estimates upward later in the year.

After rising more or less steadily since last October, the steel scrap market has settled down momentarily. Prices have leveled off after reaching record heights.

Best Scrap Year . . . But the scrap industry can look back on its best year in history. Purchased scrap shipments to the nation's mills and foundries will total 36 million tons—a new record. Exports also are likely to set a new mark of 5 million tons. Sales may reach $2 billion.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,511	2,486	2,474	2,331
Ingot Index				
(1947-1949=100)	156.3	154.8	154.0	150.2
Operating Rates				
Chicago	99.0	100.0*	109.5	98.0
Pittsburgh	101.0	97.0*	97.0	103.0
Philadelphia	103.5	105.0	103.0	105.0
Valley	100.0	100.0	99.0	99.0
West	101.0	100.0*	100.0	101.5
Detroit	104.0	106.0*	106.0	101.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	107.0	107.0*	102.5	100.0
Birmingham	94.0	94.0	96.0	94.5
S. Ohio River	92.0	97.0*	99.0	90.0
Upper Ohio R.	103.0	105.0	103.0	107.0
St. Louis	98.0	105.0	107.0	107.0
Northeast	100.0	100.0	100.0	88.5
Aggregate	102.0	101.0	100.5	100.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.04	$59.09
Scrap, No. 1 hvy (gross ton)	$65.17	$65.17	$59.83	$52.17
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	106.00	110.50	111.25	109.50
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

Ore Boats Will Keep Moving

If weather holds, ore carriers will operate on the Lakes until January . . . Move will break a 57-year record for length of season . . . Bethlehem to stop selling pig iron.

◆ PRESSURE for iron ore will result in ore boats on the Great Lakes continuing their operations into January if weather conditions permit.

While shipments have been above expectations since the carriers resumed operations in September, lengthening of the shipping season by two major fleets is not surprising. Efforts to make up for strike-lost shipments, continued peak steel production and high scrap prices are factors putting pressure on for ore supplies.

Allegheny Ludlum Steel Corp. announced the following base price increases on nickel-bearing stainless steels: Type 201, 1¾¢ per lb; type 301, 2¢; type 302, 2½¢; type 304, 3¢; type 309, 4¢, and type 310, 6¢. Boosts are effective Dec. 12.

The ore situation and high scrap prices probably influenced the decision by Bethlehem Steel to stop selling merchant pig iron in the open market after January 1.

The fifty ore carriers of the Pittsburgh Steamship fleet will break a 57-year cargoloading record on Dec. 18. Previous record was set on December 17, 1899, when the Str. Malietoa took the last cargo of ore for the season from Two Harbors, Minn. Another major fleet operator—the Browning Steamship Co.—is also continuing operations.

Average daily ore loadings last week were 211,000 tons as compared with 74,000 a year ago. Total shipments for the year as of Dec. 3 are 76.5 million tons. Deficit behind last year has been cut from about 13 million tons at the end of the steel strike to about 10.7 million tons.

A move by Bethlehem Steel Co. to increase production of plate at Sparrows Pt. will result in a temporary loss of 40 pct of the firm's sheared plate production in the area. The firm's 160-in. sheared plate mill will be out of operation for about two months while being revamped as a roughing stand to operate in tandem with a new 160-in. plate mill.

A record complete blast furnace relining job—with relighting taking place after only 32 days of lost production — has been announced by the Canton works of Republic Steel Corp. When the Canton blast furnace was last relined in 1948, 42 days were required to complete the job.

Price News: Detroit Steel Corp. announces new lower base prices on cold-rolled annealed spring steel over .60 to .80 pct carbon of $12.10 per hundred lb at Detroit and $12.30 at New Haven, Conn. Sharon Steel Corp., Dearborn Div., has also revised cold-rolled spring steel (carbon content over .60 to .80 pct) to $12.10.

SHEET AND STRIP . . . Cold-rolled strip is available on about 3 weeks delivery at **Cleveland** because of the continued slowness in automotive demand. Stainless strip deliveries are running at about 4-5 weeks. This market is also a bit slow because of the automotive lull. There are indications of a January upturn. Deliveries on cold-rolled sheet are current. Auto buyers are able to get the supplies they want because of the relative looseness of the market.

February orders are being booked on hot and cold-rolled strip at **Philadelphia.** With nickel supply tight, chrome nickel sheet is being quoted at 7 weeks.

At **Pittsburgh** one mill is booked solid through January on cold-rolled sheet. February and March orders are coming at a fast rate. Hot-rolled sheet remains tight.

Hot-rolled sheet is sold out at **Chicago** for the coming quarter. Market for cold-rolled is described as "weak."

PLATE AND STRUCTURALS . . . Further quota cuts on both grades at **Chicago** have stepped up the hunt for conversion space during the first quarter. Nearly all plate and structural fabricating operations are on a reduced schedule.

There are sizeable carryovers in plate and structurals at **Pittsburgh** area mills. U. S. Steel will start construction early next year on facilities there to add 450,000 tons in plates, structurals, forgings, and other products.

BARS . . . Cold finished bars are available in **Cleveland** and **Chicago** on about 2-3 week delivery with a somewhat shorter time for standard items. Hot-rolled bars in **Cleveland** are still booked at near capacity into the first quarter.

Pittsburgh producers are sold out for January on hot-rolled bars. Customers for h-r carbon bars are being put on a quota system by one **Philadelphia** area producer. Same mill is quoting 5 week delivery on h-r alloy bars. Cold finished bars are in good supply with the demand weak.

WAREHOUSES . . . All hot-rolled items continue tight and are carrying the lion's share of the business load. There are continued cancellations on spot tonnages of cold-rolled sheet at **Chicago.** This grade, with cold finished bar, seems to be the heaviest inventory item. It's being offered at not much above the mill price. At **Pittsburgh,** mill shipments of plates and structurals are up slightly, but not enough to meet demand. Stocks of hot-rolled and cold finished bar are at normal levels. Hot-rolled sheet is still tight.

Purchasing Agent's Checklist

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PRICING: Nickel price jump may result in increases in stainless steel costs ..... p. 88

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Comparison of Prices

(Effective Dec. 11, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 11 1956	Dec. 4 1956	Nov. 13 1956	Dec. 14 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.95	$9.95	$9.95	$9.05
Tinplates, electro (0.50 lb.)	8.65	8.65	8.65	7.75
Special coated mfg. ternes	9.20	9.20	9.20	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢	5.174¢

	Dec. 11 1956	Dec. 4 1956	Nov. 13 1956	Dec. 14 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	11.75¢	11.75¢	11.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.04	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$66.50	$66.50	$62.50	$53.50
No. 1 steel, Phila. area	62.50	62.50	58.50	51.50
No. 1 steel, Chicago	66.50	66.50	62.50	51.50
No. 1 bundles, Detroit	60.50	60.50	60.50	45.50
Low phos., Youngstown	70.50	70.50	68.50	55.00
No. 1 mach'y cast, Pittsburgh	61.50	61.50	61.50	54.50
No. 1 mach'y cast, Philadel'a	59.50	59.50	58.00	56.50
No. 1 mach'y cast, Chicago	58.50	58.50	58.50	56.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$65.17	$65.17	$61.17	$52.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.50	$15.50	$15.50	$14.25
Foundry coke, prompt	$18-19	$18-19	$18-19	$16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Tin, Straits, New York	*106.00*†	110.50	107.00	109.50
Zinc, East St. Louis	13.50	13.50	13.50	13.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 190→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	64.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Lone Star *L3*	58.50‡	59.00‡	.....	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	.....
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1*, *I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: $64.00.

STAINLESS STEEL

Base price cents per lb. f.a.b. mill.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.35	38.75	41.50	40.75	63.50	48.00	56.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pg., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

Market Begins To Level Off

Major markets reflect possible peak . . . But no real break is anticipated . . . Slight easing of No. 2 grades shows up in some areas . . . Turnings continue gain.

◆ THE MARKET'S record-breaking climb that began its surge in mid-October is at a halt—at least temporarily.

A few scattered increases in equally scattered markets and commodities are reflected this week. But these are counter-balanced by some small declines and a leveling off of primary grades in major markets with some apparent easing in No. 2 grades.

Most increases this week are in railroad grades, indicating the closing of the lists, and in turnings, reflecting the continued high rate and pressure on blast furnace operations.

The leveling was accompanied by bearish talk in a few instances. But this appears to be wishful thinking for the most part. Demand is still strong; collections are slow; and peak operating rates of steel mills assure no letup in scrap demand.

Mill attempts to undercut the market with new low offers met with little success and scant tonnages. In fact, some yards are intent on building their inventories, indicating they forecast no break in the market and may even anticipate new gains.

No real break in the market is anticipated at this time. Peak demand with no surplus (possibly even a shortage) of scrap will prevent a significant break.

As a result of the leveling in major markets, THE IRON AGE Composite price remained unchanged. The two-months surge brought the Composite from $56.17 in October to $65.17, a climb of $9 before reaching a plateau.

Pittsburgh . . . Prices of openhearth grades are unchanged. Brokers are paying $1 under the mill prices and report a slight pickup in shipments. However, there is still not a heavy movement of scrap. No. 1 heavy melting is very tight. No. 2 heavy melting is a little more plentiful. No. 2 bundles are the easiest openhearth grade to get. Blast furnace grades moved up $1 on a purchase by a local mill. Railroad lists show all grades holding or improved.

Chicago . . . The market holds steady as local mills made new offers at low prices, but fringe mills continued to boost offering prices in an effort to encourage scrap flow. Bearish reports of the past few days were not confirmed by any cutback in broker buying. Offers by mills to buy at prices lower than current levels brought little tonnage. The only effect thus far has been a leveling in the market and some easing in supplies of No. 2 dealer bundles.

Philadelphia . . . This market for the most part was keeping an even keel. Pressure eased and brokers and dealers confined activity to cleaning up orders written during and after the sudden price surge two weeks ago. No large mill buys were reported. Export is slow. Little if any gain in activity is expected until after the New Year.

New York . . . Continued high purchases substantiate current price levels. There may be indications that the peak has been reached. However, brokers report some difficulty obtaining scrap to fill orders.

Detroit . . . Prices remain unchanged on the basis of new mill buying. Brokers are paying the same prices for December orders as they did last month. Feeling is that the market is not standing still, but is moving at its present high level. Indications are that current prices may well hold up through the end of the month.

Cleveland . . . Held-up scrap for fringe area mills has been released, together with some small additional buys of low phos at prevailing prices. The market remains quiet with holdups due to continue. Heavy tonnages of scrap purchased for local mills are being diverted to eastern Pennsylvania at about $6.50 per ton freight costs.

Birmingham . . . Scrap dealers report an increasing intake of scrap into their yards. Most dealers, however, say inventories are building up slowly and some seem reluctant to accept orders at this time. But others feel the market is now at its top and are actively soliciting orders to move high priced scrap. The electric furnace market continues strong and prices advanced $2 per ton on specialty items. Steel mills in the area are out of the market and one has held up orders. Cast is steady. Export continues strong.

St. Louis . . . The market continues strong and advances were made in blast furnace grades in sympathy with higher prices in other markets. Mills are taking all the tonnage they can get.

Cincinnati . . . The market is in easy supply and demand with area mills taking shipments steadily. Some talk of lower prices may scare out additional shipments from dealers holding up for next year. Foundry business is still slow.

Buffalo . . . Strength continues to permeate the market here. However, some dealers feel a leveling off point has been reached. No major sales were made last week, but scrap is still being shipped by water to area's biggest consumer despite lateness of shipping season.

Boston . . . New England market is virtually unchanged. Export is slow, but domestic demand is strong. Mills in the district have been active purchasers and demand from Pennsylvania consumers is strong.

West Coast . . . The market is quiet in all three major areas: Los Angeles, San Francisco, and Seattle. Prices are holding firm following first-of-month readjustments that widened the gap between primary and secondary grades. While exporting continues active, mills report they are getting all they need.

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Scrap Prices *(Effective Dec. 11, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$66.00 to $67.00
No. 2 hvy. melting	58.00 to 59.00
No. 1 dealer bundles	66.00 to 67.00
No. 1 factory bundles	74.00 to 75.00
No. 2 bundles	53.00 to 54.00
Machine shop turn.	43.00 to 44.00
Mixed bor. and ms. turn.	43.00 to 44.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. punch'gs plate	72.00 to 73.00
Heavy turnings	59.00 to 60.00
No. 1 RR. hvy. melting	71.00 to 72.00
Scrap rails, random lgth.	79.00 to 80.00
Rails 2 ft and under	83.00 to 84.00
RR. steel wheels	75.00 to 76.00
RR. spring steel	75.00 to 76.00
RR. couplers and knuckles	75.00 to 76.00
No. 1 machinery cast.	61.00 to 62.00
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	52.00 to 53.00

Chicago

No. 1 hvy. melting	$66.00 to $67.00
No. 2 hvy. melting	56.00 to 57.00
No. 1 dealer bundles	66.00 to 67.00
No. 1 factory bundles	73.00 to 75.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	43.00 to 44.00
Mixed bor. and turn.	45.00 to 46.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	45.00 to 46.00
Low phos. forge crops	76.00 to 77.00
Low phos. punch'gs plate	73.00 to 74.00
Low phos. 3 ft and under	71.00 to 72.00
No. 1 RR. hvy. melting	72.00 to 74.00
Scrap rails, random lgth.	83.00 to 84.00
Rerolling rails	94.00 to 96.00
Rails 2 ft and under	91.00 to 92.00
Locomotive tires, cut	76.00 to 77.00
Cut bolsters & side frames	76.00 to 77.00
Angles and splice bars	81.00 to 82.00
RR. steel car axles	95.00 to 96.00
RR. couplers and knuckles	75.00 to 76.00
No. 1 machine cast	58.00 to 59.00
Cupola cast	53.00 to 54.00
Heavy breakable cast	51.00 to 52.00
Cast iron brake shoe	50.00 to 51.00
Cast iron wheels	68.00 to 60.00
Malleable	73.00 to 74.00
Stove plate	50.00 to 51.00
Steel car wheels	76.00 to 77.00

Philadelphia Area

No. 1 hvy. melting	$62.00 to $63.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	45.00 to 46.00
Mixed bor. short turn.	45.00 to 46.00
Cast iron borings	45.00 to 46.00
Shoveling turnings	48.00 to 49.00
Clean cast chem. borings	51.00 to 52.00
Low phos. 5 ft and under	67.00 to 68.00
Low phos. 2 ft and under	69.00 to 70.00
Low phos. punch'gs	69.00 to 70.00
Elec. furnace bundles	64.00 to 65.00
Heavy turnings	58.00 to 59.00
RR. steel wheels	71.00 to 72.00
RR. spring steel	71.00 to 72.00
Rails 18 in. and under	81.00 to 82.00
Cupola cast	52.00 to 54.00
Heavy breakable cast	58.00 to 59.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast	59.00 to 60.00

Cleveland

No. 1 hvy. melting	$64.50 to $65.50
No. 2 hvy. melting	55.00 to 56.00
No. 1 dealer bundles	64.50 to 65.50
No. 1 factory bundles	71.00 to 72.00
No. 2 bundles	46.00 to 47.00
No. 1 busheling	64.50 to 65.50
Machine shop turn.	35.00 to 36.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Cut struct'r'l & plates, 2 ft. & under	70.00 to 71.00
Drop forge flashings	65.50 to 66.50
Low phos. punch'gs, plate	65.50 to 66.50
Foundry steel, 2 ft & under	61.00 to 62.00
No. 1 RR. heavy melting	70.00 to 71.00
Rails 2 ft and under	84.00 to 85.00
Rails 18 in. and under	85.00 to 86.00
Railroad grate bars	49.00 to 50.00
Steel axle turnings	44.00 to 45.00
Railroad cast	61.00 to 62.00
No. 1 machinery cast	60.00 to 61.00
Stove plate	54.00 to 55.00
Malleable	71.00 to 72.00

Youngstown

No. 1 hvy. melting	$67.00 to $68.00
No. 2 hvy. melting	59.00 to 60.00
No. 1 dealer bundles	67.00 to 68.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	35.00 to 36.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	40.00 to 41.00
Low phos. plate	70.00 to 71.00

Buffalo

No. 1 hvy. melting	$60.00 to $61.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 busheling	60.00 to 61.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	35.00 to 36.00
Low phos. plate	65.00 to 66.00
Scrap rails, random lgth.	63.00 to 64.00
Rails 2 ft and under	79.00 to 80.00
RR. steel wheels	65.00 to 66.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	74.00 to 75.00
No. 1 machinery cast	54.00 to 55.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$59.00 to $60.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	40.00 to 41.00
New busheling	59.00 to 60.00
Drop forge flashings	58.50 to 59.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	59.00 to 60.00
No. 1 cupola cast	51.00 to 52.00
Heavy breakable cast	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	44.00 to 45.00
Machine shop turn.	40.00 to 41.00
Cast iron borings	42.00 to 43.00
Shoveling turnings	42.00 to 43.00
No. 1 RR. hvy. melting	66.00 to 67.00
Rails, random lengths	82.00 to 83.00
Rails 18 in. and under	86.00 to 87.00
Locomotive tires uncut	70.00 to 71.00
Angles and splice bars	72.00 to 73.00
Std. steel car axles	87.00 to 88.00
RR. specialties	73.00 to 74.00
Cupola cast	.... 51.00
Heavy breakable cast	46.50 to 47.50
Cast iron brake shoes	54.00 to 55.00
Stove plate	44.00 to 45.00
Cast iron car wheels	56.00 to 57.00
Rerolling rails	90.00 to 91.00
Unstripped motor blocks	45.50 to 46.50

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 bundles	40.50 to 41.50
No. 1 busheling	54.00 to 55.00
Elec. furnace, 3 ft & under	56.00 to 57.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and short turn.	34.00 to 35.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	37.00 to 38.00
No. 1 machinery cast	47.00 to 48.00
Mixed cupola cast	43.00 to 44.00
Heavy breakable cast	45.00 to 46.00
Stove plate	41.00 to 42.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	49.00 to 50.00
No. 2 dealer bundles	47.00 to 48.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and turn.	41.00 to 42.00
Shoveling turnings	42.00 to 43.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast	52.00 to 53.00
Mixed yard cast	47.00 to 48.00
Charging box cast	50.00 to 51.00
Heavy breakable cast	50.00 to 51.00
Unstripped motor blocks	40.00 to 41.00

Birmingham

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	36.00 to 37.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	56.00 to 57.00
Bar crops and plate	62.00 to 63.00
Structural and plate, 2 ft	61.00 to 62.00
No. 1 RR. hvy. melting	63.00 to 64.00
Scrap rails, random lgth.	71.00 to 72.00
Rails, 18 in. and under	76.00 to 77.00
Angles & splice bars	68.00 to 69.00
Rerolling rails	82.00 to 83.00
No. 1 cupola cast	52.00 to 53.00
Stove plate	51.00 to 52.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	44.00 to 45.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$62.00 to $63.00
No. 2 hvy. melting	52.00 to 53.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	41.00 to 42.00
Mixed bor. and turn.	41.00 to 42.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	41.00 to 42.00
Low phos. 18 in. & under	69.00 to 70.00
Rails, random lengths	76.00 to 77.00
Rails, 18 in. and under	82.00 to 83.00
No. 1 cupola cast	48.00 to 49.00
Hvy. breakable cast	47.00 to 48.00
Drop broken cast	59.00 to 60.00

San Francisco

No. 1 hvy. melting	....	$55.00
No. 2 hvy. melting	....	52.00
No. 1 dealer bundles	....	54.00
No. 2 bundles	....	40.00
Machine shop turn.	....	35.00
Cast iron borings	....	35.00
No. 1 RR. hvy. melting	....	55.00
No. 1 cupola cast	....	57.00

Los Angeles

No. 1 hvy. melting	....	$54.00
No. 2 hvy. melting	....	52.00
No. 1 dealer bundles	....	53.00
No. 2 bundles	....	38.00
Machine shop turn.	....	35.00
Shoveling turnings	....	38.00
Cast iron borings	....	35.00
Elec. furn. 1 ft. and under (foundry)	....	66.00
No. 1 RR. hvy. melting	....	54.00
No. 1 cupola cast	....	56.00

Seattle

No. 1 hvy. melting	....	$54.00
No. 2 hvy. melting	....	51.00
No. 2 bundles	$33.00 to	35.00
No. 1 cupola cast	....	55.00
Mixed yard cast	....	55.00

Hamilton, Ont.

No. 1 hvy. melting	....	$54.00
No. 2 hvy. melting	....	47.00
No. 1 dealer bundles	....	54.00
No. 2 bundles	....	40.50
Mixed steel scrap	....	46.00
Bushelings	....	39.50
Bush., new fact., prep'd.	....	52.00
Bush., new fact., unprep'd.	....	48.00
Machine shop turn.	....	31.00
Short steel turn.	....	35.00
Mixed bor. and turn.	....	28.00
Rails, rerolling	....	60.00
Cast scrap	....	50.00

Nickel Price Up 9½c to 74c

International Nickel bumps the price for first time since late 1954 . . . Will use the additional money to finance major expansion . . . Government report issued.

◆ AS THE RESULT of the activity in nickel markets this week consumers can look forward to:

(1) Paying more for their metal.

(2) More metal available in about 4 years.

(3) A good chance that closer tabs will be kept on who gets how much non-defense nickel in the future.

International Nickel Co. is responsible for points 1 and 2. Inco announced an increase of 9½¢ per lb in the price of primary nickel in the U. S., effective Dec. 6. Corresponding increases were also initiated for nickel oxide sinter, and nickel and nickel alloy mill and foundry products from company's plants.

Falconbridge Nickel Mines, Ltd., world's second largest producer, will follow suit. And another major producer, Sherritt-Gordon Mines, Ltd., indicates its contracts provide that its prices follow the general level.

Inco said the increase was made to "deal with higher costs and facilitate maximum production." The company will lay out about $175 million for a gigantic expansion project in Manitoba designed to boost its production 50 pct by 1960. The added take (it won't have any noticeable effect on demand) will come in handy financing the program. (For full expansion plans see page 89.)

The price jump should have caught very few napping. It was more than overdue. The last increase was Nov. 24, 1954. However, the extent of the boost may have surprised to some extent. The new increase is above the average amount nickel price has increased in the last decade.

The report of the Senate Select Committee on Small Business investigating supply and distribution of nickel was also issued. The group stated that it had failed to answer the basic question as to the equitability of distribution of non-defense nickel. The reason: government agencies forbid the publication of even non-defense nickel statistics on the assumption that by deduction it would disclose classified information.

However, the committee did publish six conclusions and recommendations. They are:

1) The electroplating industry has not been receiving an equitable share of the available supply of non-defense nickel.

2) The executive branch of the government has the firm responsibility to insure the equitable distribution of non-defense nickel.

3) Available data as to the structure of the nickel consuming industry and the distribution of non-defense nickel are "woefully inadequate." Congress should consider directing the Small Business Administration to develop, gather and correlate data. It would be helpful to industry and government in determining the need and degree of controls or supplementary legislation.

4) Real relief for small users of nickel can be brought about only through increased production.

5) Within the electroplating industry there is confusion, conflict and inconsistency in systems of allocation.

6) Abuses of the defense rating system should be stamped out and violators "prosecuted vigorously."

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	23.00	24.00	8/10/56
Copper (E)	36.00	40.00	10/26/56
Copper (CS)	35.75	36.00	11/24/56
Copper (L)	36.00	40.00	10/27/56
Lead, E. St. L.	16.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	13.00	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 186.

ALUMINUM . . . For the second time in two years, waterpower, or the lack of it, is playing a major role in the production schedules of aluminum. It is a good illustration of why most new aluminum plants are being built in the East.

This time the three major U.S. producers have been hit, by a curtailment from the Bonneville Power Administration. There simply isn't enough water in the Columbia River.

Last year a shortage of water in Canada cost Aluminium Ltd. about 90,000 tons of production, much of which would have ended up in U.S.

The 1956 shortage is not nearly as serious because, 1) the market is not as tight, 2) substitute, although more expensive, power is available to Alcoa, Reynolds and Kaiser.

The latter two will use steam. Alcoa will buy power from the Hungry Horse development.

MAGNESIUM . . . The Magnesium Assn. reports that despite the production lost due to strikes, the industry in 1956 was able to boost output by about 14 pct over 1955.

The Association feels that barring anything unforeseen, production in 1957 should be considerably higher, possibly close to 80,000 tons. Output for 1956 will be about 68,000 tons.

Despite the overall bright outlook, not all segments of the industry are enjoying prosperity. Sand casting foundries are having a difficult time just about staying even. And die casters have suffered from the decline in automotive business.

Tin prices for the week: Dec. 5—109.00; Dec. 6—108.75; Dec. 7—108.25; Dec. 10—106.00; Dec. 11—106.00.*

* Estimate

Nonferrous Prices *(Effective Dec. 11, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1800, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061–0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6– 8	45.5–47.3	61.3–65.1
12–14	46.2–47.7	62.2–66.8
24–26	49.4–49.5	73.1–77.8
36–38	58.3–59.0	97.4–101.0

Screw Machine Stock—2011-T-3

Size*	¼	⅜–⅝	¾–1	1¼–1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250–3.00	.250–2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, bar, HR	94	80	99
Angles, HR	94	80	99
Plates, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	58.13	.....	55.36	58.32
Brass, 70/30	50.19	50.73	50.13	53.10
Brass, Low	53.40	53.94	53.34	56.21
Brass, R L	54.54	55.08	54.48	57.35
Brass, Naval	54.14	.....	48.45	57.55
Muntz Metal	52.19	.....	48.00	.....
Comm. Bz.	56.23	56.77	56.17	58.75
Mang. Bz.	57.88	.....	51.98	.....
Phos. Bz. 5%	77.25	.....	77.25	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis.... $ 1.31
Cobalt, 97-99% (per lb).. $2.35 to $2.42
Germanium, per gm, f.o.b. Miami, Okla., refined $48.50
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz.. $23 to $24
Platinum, dollars per troy oz..$103 to $105
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg $43.00
Uranium, normal per kg $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 35.00
No. 120 ..... 33.75
No. 123 ..... 32.25
80-10-10 ingot
No. 305 ..... 38.50
No. 315 ..... 36.75
88-10-2 ingot
No. 210 ..... 48.75
No. 215 ..... 44.50
No. 245 ..... 40.00
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 421 ..... 30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 26.25-27.00
0.60 copper max. 26.00-26.75
Piston alloys (No. 122 type).. 26.00-26.75
No. 12 alum. (No. 2 grade) 23.75-25.00
108 alloy 24.00-25.00
195 alloy 26.50-27.00
13 alloy (0.60 copper max.)... 26.00-26.75
AXS-679 ..... 24.00-25.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 24.00-25.50
Grade 2—92-95% 23.25-24.50
Grade 3—90-92% 22.50-23.75
Grade 4—85-90% 21.75-22.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	32	31¼
Yellow brass	24⅝	22⅝
Red brass	28½	27⅝
Comm. bronze	29½	28¾
Mang. bronze	23½	22¼
Yellow brass rod ends	24⅝	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30¼
No. 2 copper wire	28⅜
Light copper	26½
*Refinery brass	27¼

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	30¼
No. 2 copper wire	28¾
Light copper	26½
No. 1 composition	27½
No. 1 comp. turnings	27
Hvy. yellow brass solids	20½
Brass pipe	20½
Radiators	22

Aluminum

Mixed old cast	16½—17½
Mixed new clips	17 —18
Mixed turnings, dry	16½—17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	27¼—27¾
No. 2 copper wire	25¾—26¼
Light copper	23¼—23¾
Auto radiators (unsweated)	17½—18
No. 1 composition	24 —24½
No. 1 composition turnings	22½—23
Cocks and faucets	18½—19
Clean heavy yellow brass	16 —16½
Brass pipe	19 —19½
New soft brass clippings	21 —21½
No. 1 brass rod turnings	18 —18½

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcases	12 —12½
1100 (2S) aluminum clippings	15 —15½
Old sheet and utensils	12 —12½
Borings and turnings	8 — 8½
Industrial castings	12 —12½
2024 (24S) clippings	13½—14

Zinc

New zinc clippings	7 — 7½
Old zinc	4½— 5
Zinc routings	2¾— 3
Old die cast scrap	2½— 2¾

Nickel and Monel

Pure nickel clippings	$1.75-$1.85
Clean nickel turnings	$1.50-$1.60
Nickel anodes	$1.75-$1.85
Nickel rod ends	$1.75-$1.85
New Monel clippings	75-80
Clean Monel turnings	70-75
Old sheet Monel	70-80
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	12½—13
Battery plates (dry)	7 — 7¼
Batteries, acid free	4½

Miscellaneous

Block tin	80 —81
No. 1 pewter	62½—63
Auto babbitt	42 —42½
Mixed common babbitt	13 —13½
Solder joints	18 —18½
Siphon tops	42
Small foundry type	15¼—15½
Monotype	14½—15
Lino. and stereotype	13 —13½
Electrotype	12½—12¾
Hand picked type shells	10 —10½
Lino. and stereo. dross	5¼— 5¾
Electro. dross	**4¼— 4½**

IRON AGE

STEEL PRICES

(Effective Dec. 11, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 B3		5.05 B3	7.40 B3	5.05 B3						
	Buffalo, N. Y.	$74.00 B3, R3	$91.50 B3, R3	$107.00 B3, R3	5.90 B3	5.05 B3	7.40 B3	5.05 B3	4.675 B3, R3	6.85 R7	6.95 B3			
	Claymont, Del.													
	Harrison, N. J.													14.55 C11
	Conshohocken, Pa.		$96.50 A2	$114.00 A2					4.725 A2	6.90 A2	6.95 A2			
	New Bedford, Mass.									7.30 R6				
	Johnstown, Pa.	$74.00 B3	$91.50 B3	$107.00 B3		5.05 B3	7.40 B3							
	Boston, Mass.									7.40 T8				14.90 T8
	New Haven, Conn.									7.30 D1				
	Baltimore, Md.									6.85 T8				
	Phoenixville, Pa.					5.85 P2		5.85 P2						
	Sparrows Pt., Md.								4.675 B3		6.95 B3			
	Bridgeport, Wallingford, Conn.	$79.00 N8	$96.50 N8	$107.00 N8						7.30 W1 6.95 N8				
	Pawtucket, R. I. Worcester, Mass.									7.48 A5,N7				14.90 N7
MIDDLE WEST	Alton, Ill.								4.675 L1					
	Ashland, Ky.								4.675 A7					
	Canton-Massillon, Dover, Ohio		$94.00 R3	$107.00 R3, T5						6.85 G4		10.10 G4		14.55 G4
	Chicago, Ill. Franklin Park, Ill.	$74.00 U1, R3	$91.50 U1, R3,W8	$107.00 U1, R3,W8	5.90 U1	5.00 U1, W8	7.35 U1, Y1 6.80 W8	5.00 U1	4.675N4 4.675 A1	6.95 A1,T8			7.75 W8 S9	14.55 A1, S9,T8
	Cleveland, Ohio									6.85 A5,J3			7.75 J3	
	Detroit, Mich.	$74.00 R5		$107.00 R5					4.775 G3, M2	6.95 M2,G3, D2,P11	7.05 G3	10.10 G3, D2	7.05 G3	
	Anderson, Ind.									6.85 G4		10.10 G4		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 U1	$91.50 U1	$107.00 U1, Y1	5.90 I3	5.00 U1	7.35 U1,I3	5.00 I3	4.675 U1, I3,Y1	5.85 Y1	6.95 U1, I3,Y1	10.20 Y1	7.75 U1, Y1	
	Sterling, Ill.	$74.00 N4							4.775 N4					
	Indianapolis, Ind.									7.00 C5				
	Newport, Ky.												7.75 N5	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 S1, C10	$107.00 S1, C10					4.675 S1, R3	6.85 T4	6.95 S1, R3	10.00 S1, R3	7.75 S1	14.55 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 U1, J3	$91.50 U1, J3,C11	$107.00 U1, C11	5.90 U1	5.00 U1, J3	7.35 U1, J3	5.00 U1	4.675 P6	5.750 P6 6.85 J3,B4, S7			7.75 S9	14.55 S9
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 W3			4.675 W3	6.85 W3,F3	6.95 W3	9.65 W3		
	Youngstown, Ohio	$74.00 R3	$91.50 Y1, C10	$107.00 Y1		5.00 Y1	7.35 Y1		4.675 U1, Y1	6.85 Y1,C5	6.95 U1, Y1	10.20 Y1	7.75 U1, Y1	
WEST	Fontana, Cal.	$83.50 K1	$101.00 K1	$128.00 K1		5.70 K1	8.05 K1	5.85 K1	5.475 K1	8.50 K1				
	Geneva, Utah	$91.50 C7				5.00 C7	7.35 C7							
	Kansas City, Mo.					5.10 S2	7.45 S2		4.925 S2		7.20 S2			
	Los Angeles, Torrance, Cal.		$101.00 B2	$127.00 B2		5.70 C7, B2	8.05 B2		5.425 B2, C7	8.80 C1			8.95 B2	
	Minnequa, Colo.					5.30 C6			5.775 C6					
	Portland, Ore.					5.75 O2								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 B2			5.65 B2	8.00 B2		5.425 C7,B2					
	Seattle, Wash.		$105.00 B2			5.75 B2	8.10 B2		5.675 B2					
SOUTH	Atlanta, Ga.								4.875 A8					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 T2	$91.50 T2			5.00 T2,R3 5.30 C16	7.35 T2		4.675 T2,R3 4.975 C10		6.95 T2			
	Houston, Lone Star, Texas	$80.00 L3	$96.50 S2	$112.00 S2		5.10 S2	7.45 S2		4.925 S2		7.20 S2			

IRON AGE

STEEL PRICES

(Effective Dec. 11, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terms deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct .2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.80 *U1*	$8.50 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.80 *B3*		
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.70 *U1, Y1*	$8.40 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.50 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.70 *J3, U1*	$8.40 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.80 *W5*	$8.30 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*				$10.35 *K1*	$9.05 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.80 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.45 *C7*	$9.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2,*	6.30 *T2, R3*							5.80 *T2,R3*	$9.80 *T2*	$8.50 *T2*	
	Houston, Tex.										6.05 *S2*			

STEEL PRICES

(Effective Dec. 11, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon † Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.25 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 C3			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2 W8,L2,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3, R3, S9, B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3*	7.175 *B2*		8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburgh, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.375 *C16*	5.075 *T2,R3* 5.375 *C16*				7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

Steel Prices *(Effective Dec. 11, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Stee Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fontana *K1*	0.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75								
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75								
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75								
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75								
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Fontana *K1*	4.50		8.50		10.50		11.00		11.50		12.00		12.50									
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75								
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75								
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75								
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., [illegible] pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				33.25
	304	34.60	38.00	41.50	35.25
	316	39.70	43.20	46.65	52.25
	321	36.35	39.80	43.50	42.00
	347	39.50	43.95	48.45	51.00
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.65; 1 side, 33.40.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	9.00	9.20	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Meter	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60		
		Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*) Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"1" Fence Posts Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	195	187	8.10	8.50
Aliquippa, Pa. *J3***	164	179		181	7.95	8.475
Atlanta *A8***	166	182	192	190	8.05	8.65
Bartonville *K2***	166	182	192	190	8.05	8.65
Buffalo *W5*					8.10	8.50
Chicago, Ill. *N4***	164	186	167 190	188	7.95	8.55
Cleveland *A6*	173				8.10	
Cleveland *A5*					7.95	
Crawfordsville *M4***	166	182	192	190	8.05	8.65
Donora, Pa. *A5*	164	176	190	184	7.95	8.35
Duluth *A5*	164	176	190	184	7.95	8.35
Fairfield, Ala. *T2*	164	176	190	184	7.95	8.35
Galveston *D4*	169†					
Houston *S2*	169	181	195	189	8.20	8.60
Johnstown, Pa. *B3***..	164	180	167	188	7.95	8.55
Joliet, Ill. *A5*	164	176	190	184	7.95	8.35
Kokomo, Ind. *C9**	166	178	192	186	8.05	8.45
Los Angeles *B2***					8.90	9.50
Kansas City *S2**	169	181	195	189	8.20	8.60
Minnequa *C6*†	169	181	172 195	189	8.20	8.60
Monessen *P6*	167	185		191	8.10	8.10
Pittsburg, Cal. *C7*	186	199		204	8.90	9.30
Portsmouth *P7*					8.10	
Rankin, Pa. *A5*	164	176		184	7.95	8.35
So. Chicago *R3*	167	181	195	187	8.10	8.50
S. San Francisco *C6*			214		8.90	9.30
Sparrows Pt. *B3***	166		192	190	8.05	8.65
Struthers, O. *Y1**					7.95	8.45
Worcester *A5*	170				8.25	8.65
Williamsport, Pa. *S5*			175			

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets: Hot-Rolled 18 ga. & hvr.	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.07	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....
Baltimore	$.10	7.79	8.99	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.09
Birmingham	.15	7.68	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.78–8.86	9.73–9.83	11.02	8.79–8.89	.....	8.98–9.08	8.80–9.00	8.38–8.98	10.71–10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70–7.85	8.90–9.05	9.70	7.78–7.93	.....	8.01–8.16	8.05–8.20	7.91–8.06	8.35–8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.90	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.68	8.88	9.60	7.88	.....	8.21	8.38	7.99	8.60	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.50	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.06	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09
Houston		8.70	9.65	.....	8.80	.....	8.60	8.90	8.45	10.55	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	8.90	10.65	11.65	9.10	.....	9.35	8.95	8.80	11.70	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.82	9.02	9.82	7.90	.....	8.13	8.24	8.03	8.57	14.77	.....	18.17	17.87
New York	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89–7.99	9.08–9.18	9.66–10.22	8.58–8.68	.....	8.28–8.38	8.33–8.44	8.37–8.47	9.12–9.22	14.80	14.15–14.25	18.20	17.90
Pittsburgh	.15	7.68	8.88	10.05	7.88	.....	8.01	8.20	7.91	8.60	14.65	13.80–14.10	18.05	16.85–17.75
Portland		8.90	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	8.75	10.30	10.80	8.95	.....	8.85	8.85	8.80	12.30	15.85	15.35	19.70	19.45
Seattle		9.35	10.45	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02–8.17	9.21–9.49†	10.03–10.18	8.11–8.26	.....	8.34–8.49	8.48–8.63	8.25–8.40	8.93–9.08	14.83–14.98	14.28	18.23–18.38	17.93
St. Paul	.15	8.29	9.64	10.31	8.39	.....	8.71	8.75	8.52	9.21	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

CR-SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. *W12*			12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.60	15.00	
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.10	15.10	.....
Detroit *D2*	8.05	9.90	12.10	.....	.....
Dover, O. *C6*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	.....	.....	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.30	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	7.95	9.80	12.60	15.00	17.95
Trenton *R4*	.....	10.10	12.90	15.30	18.25
Wallingford *W1*	8.48	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	33.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

(Effective Dec. 11, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35	....	....	....	....
So. Chicago *R3*	....	....	....	8.775	....	....	....
Ensley *T2*	5.075	6.00	....	....	....	....	....
Fairfield *T2*	....	6.00	....	8.775	....	6.025	....
Gary *U1*	5.075	6.00	....	....	....	6.025	....
Ind. Harbor *I3*	5.075	....	6.35	8.775	....	6.025	....
Ind. Harbor *Y1*	....	....	....	8.775	....	....	....
Johnstown *B3*	....	6.00	....	....	....	....	....
Joliet *U1*	5.075	....	6.35	....	....	....	....
Kansas City *S2*	....	....	....	8.775	....	....	....
Lackawanna *B3*	5.075	6.00	6.35	....	....	6.625	....
Lebanon *B3*	....	....	....	....	....	....	13.10
Minnequa Co.	5.075	6.50	6.35	8.775	....	6.025	13.10
Pittsburgh *P5*	....	....	....	8.775	12.85	....	....
Pittsburgh *J3*	....	....	....	8.775	....	....	13.10
Seattle *B2*	....	....	....	9.275	....	6.175	13.16
Steelton *B3*	5.075	....	6.35	....	....	6.025	13.10
Struthers *Y1*	....	....	....	8.775	....	....	....
Torrence *C7*	....	....	....	....	....	....	....
Williamsport *S5*	....	6.15	....	....	....	....	....
Youngstown *R3*	....	....	....	8.775	....	....	....

COKE

Furnace, beehive (f.o.b oven) Net-Ton
Connellsville, Pa. ..... $15.25 to $15.75
Foundry, beehive (f.o.b. oven)
$18.00 to $19.00

Foundry oven coke
- Buffalo, del'd $30.75
- Detroit, f.o.b. 29.50
- New England, del'd 30.55
- Seaboard, N. J., f.o.b. 28.75
- Philadelphia, f.o.b. 28.50
- Swedesland, Pa., f.o.b. 28.50
- Painesville, Ohio, f.o.b. 29.50
- Erie, Pa., f.o.b. 29.50
- Cleveland, del'd 31.55
- Cincinnati, del'd 28.59
- St. Paul, f.o.b. 28.50
- St. Louis, f.o.b. 30.50
- Birmingham, f.o.b. 27.60
- Milwaukee, f.o.b. 29.50
- Lone Star, f.o.b. 25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

*Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
- Cast elliptical, 18 in. or longer, 5000 lb lots 57.42
- Electrodeposited 45.28

Brass, 80-20, ball anodes, 2000 lb or more 58.00

Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)

Nickel, 99 pct plus, rolled carbon... 90.50
(rolled depolarized add 3¢ per lb)

Cadmium $1.70

Tin, ball anodes and elliptical $1.10 to $1.16

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 80.50

Copper sulphate, 5 or more 100 lb bags, per cwt. 20.65

Nickel salts, single, 100 lb bags.... 38.25

Nickel chloride, freight allowed, 300 lb 43.50

Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 21.55
(Philadelphia price 21.80)

Zinc cyanide, 100 to 900 lb..... 55.55

Potassium cyanide, 100 lb drum N. Y. 48.00

Chromic acid, flake type, 1 to 20 100 lb drums 29.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	58½	60½	61½
⅛" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

	Full Case or Keg Price
Nuts, Hex, HP reg. & hvy.	
¾ in. or smaller	63
⅞ in. to 1 in. inclusive	59½
1⅛ in. to 1½ in. inclusive.....	64
1⅝ in. and larger	58
C.P. Hex regular & hvy.	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58
Hot Galv. Nuts (All Types)	
¾" and smaller	50
Semi-finished Hex Nuts	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58
(Add 25 pct for broken case or keg quantities)	
Finished	
1" and smaller	65

Rivets

Base per 100 lb
½ in. and larger $10.55
Pct Off List
7/16 in. and smaller 26½

Cap Screws

	Discount (Packages) *Bright Treated*	*H. C. Heat*
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18⅓	+ 1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19⅓

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish		Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk	*Quantity*		
To ⅛" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Discount Hex	Square
In cartons	16	19
In Bulk	*Quantity*	
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.4
Chicago	133.4
San Francisco-L. A.	140.2

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 87, Sept. 1, 1955 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$128.00
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	20.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$140.00
Childs, Hays, Pa.	145.00
Chicago District	150.00
Western Utah	144.00-165.00
California	170.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.50
Silica cement, net ton, bulk, Chicago	24.00
Silica cement, net tons, bulk, Ensley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt..	$98.00
Standards chemically bonded, Curtliner, Calif.	108.00
Burned, Balt.	92.00

Magnesite Brick

Standard, Baltimore	$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite	St. ⅝ to ⅛-in. grains
Domestic, f.o.b. Baltimore in bulk.	$69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	43.00
in sacks	49.00

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads ...	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed .	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd ..	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.35 to $3.85
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder power... 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin .....14.00¢ plus metal value	
Tungsten, 99¢, (65 mesh)	$4.20
Zinc, 10 ton lots .....18.75¢ to 32.50¢	

Ferroalloy Prices

(Effective Dec. 11, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.75
8.50% max. C, 50-55% Cr, 3-6% Si .. 24.00
8.50% C, 50-55% Cr, 3% max Si.... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅜" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	11.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	11.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.90
Ton lots packed	16.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$97.50
19 to 21%	3% max.	99.50
21 to 23%	3% max.	102.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 24.15

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	35.80	38.60	39.80
0.07% max. C	33.75	36.55	37.75
0.10% max. C	33.00	35.80	37.00
0.15% max. C	32.25	35.05	36.25
0.30% max. C	30.75	33.55	34.75
0.50% max. C	30.25	33.05	34.25
0.75% max C, 80.85% Mn, 5.0-7.0% Si	27.25	30.05	31.25

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.95
Ton lots	14.60
Briquet contract basis carloads, bulk, delivered, per lb of briquet	14.40
Ton lots, packed	16.80

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	23.95	22.65
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.55
Ton lots, packed	10.35

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.50	75% Si	16.40
65% Si	15.25	85% Si	18.10
		90% Si	19.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.95

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $215.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered $3.15

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.32
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B.	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots $2.05

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Doin' Well, Thanks . . . There are no major complaints from West Coast used machinery dealers. Business is great, they agree, and 1956 should wind up as one of their biggest years. What's more, 1957 promises to be every bit as good—maybe better. Here's a close look at the top markets in southern California and northern California.

Dealers in the San Francisco Bay Area and northern California report some customers are getting a bit fussy about the price and quality of the equipment they want. Although there is still a limited market for equipment ranging up to 20 years old or so, it's the post-war stuff that moves best.

Newer the Better . . . But the big buying accent is on machinery only three or four years old. The supply of such "young" equipment is extremely limited, since it turns up chiefly only from shops forced out of business or firms liquidating for some other unusual reason.

This hard-to-get "young" equipment—reconditioned and guaranteed—will bring approximately 90 pct of new machinery prices, compared with 60 to 70 pct of new prices on post-war equipment, according to dealers surveyed by THE IRON AGE.

East Is East . . . Fewer dealers in this region report they are reaching back East for used machinery. The supply, they find, is diminishing sharply there and what is available is getting too expensive after freight is figured in. Nevertheless, some dealers still "import" items not found in this region.

According to one executive, big presses, running from 300 tons to 800 tons, are one of the hardest things to come by locally. Other fast movers: engine and turret lathes, small vertical mills, milling machines, and grinders.

Time and Tide . . . There no longer is any such item as "delivery time" on used machinery, dealers report. Buyers won't wait. They want to see what they are interested in and "We sell it as-is where-is," one sales manager observed. As has been the case all year, dealers in the San Francisco Bay Area reply with unrestrained optimism when asked how they expect to wind up the 1956 year. The most conservative guess was 5 pct to 10 pct up—some predictions ranged as high as 25 pct. Turret lathes are in high demand, as are cylindrical grinders and late-model milling machines.

Local sources say suppliers of late-model, good-condition turret lathes are able to ask for and get prices for their offerings equal to new machinery prices.

Most Wanted List . . . There are almost no late-model milling machines in good repair available. In addition, late-model good cylindrical grinders are scarce. These items still head the "most wanted" list: big planers, grinders, engine lathes, boring mills, press brakes, shears, and punch presses.

Dealers Meet . . . Accelerated depreciation allowances on machine tools and surplus disposal of government equipment were among topics discussed at a recent regional meeting of Machinery Dealers National Assn. The meeting, held in Chicago, was attended by 100 dealers. Another regional meeting is planned for the eastern area within the next few months.

Meanwhile in Seattle . . . Dealers in this market report there'll be a tight supply situation in the area during the coming winter months.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
6' x 3/16" Niagara Initial Type
8' x ¼" Webb 129-V Vertical
10' x ⅜" Bertsch Initial Type
10' x ⅜" Kling Pyramid Type
12' x ⅜" Southwark Pyramid Type
16' x ⅜" Niles Pyramid Type
20' x 1" Hilles & Jones Pyramid Type
30' x ¾" Niles Pyramid Type

BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ⅜" Dreis & Krump

BRAKES—PRESS TYPE
10' x ¼" Superior Hydraulic—NEW
10' x ½" Superior Hydraulic—NEW
12' x ½" Superior Hydraulic—NEW

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Whiting	48' Span 220/3/60 A.C.
5 ton Shaw	56' Span 230 Volt D.C.
10 ton P&H	38' Span 230 Volt D.C.
10 ton Cyclops	40' Span 220/440 A.C.
10 ton Cleveland	47' Span 440/3/60 A.C.
15 ton P&H	48' Span 230 Volt D.C.
15 ton P&H	72' Span 230 Volt D.C.
25 ton L-B	75' Span 230/3/60 A.C.
Incl. 300 ft. Runway	
80 ton Niles	72' Span 230 Volt D.C.
120 ton Niles	68' Span 440/3/60 A.C.

FORGING MACHINES
1" to 5" Acme, Ajax, National
3" Acme Model XN, Air Clutch, NEW 1954

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELLERS—ROLLER
44" Newbold Nine Rolls 4" Dia.
48" Kane & Roach 11 Rolls 4" O.D.
54" Astna Standard 17 Rolls 3¾" Dia.
72" McKay 17 Rolls 4½" Dia.

PRESSES—HYDRAULIC
500 ton Elmes 18" Stroke Lower Platen 38" x 66"
750 ton Baldwin Triple Acting Bolster 84 x 133"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—HYDRAULIC WHEEL
600 ton N-B-P 96" Between Strain Bars
800 ton N-B-P, 96" Between Strain Bars

PRESS—INCLINED
125 ton Beatty Open Back 1½" Stroke. Area of Bed 28⅝" x 26¾"

PRESSES—STRAIGHT SIDE
Cleveland IT-48 Double Acting, 20" Stroke of Slide 14" Stroke of Blankholder, Bolster 48x48"
Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14". Bed Area 100" x 200"
Toledo 203E Overhanging, 10" Str. 38x40" Bolster
Bliss 306 6" Stroke, Bed Area 26" x 26"
100 ton Clearing 14" Stroke, 36" x 36" Bed
250 ton Bliss, 16" Stroke, 29" x 29" Bed
250 ton Toledo, 6 Stroke, 36" x 72" Bed
150 ton Toledo #6½-60, 6" Stroke, Bolster 36 x 60"

PUNCH & SHEAR COMBINATIONS
ME-10 Pels Ironworker, Capacity Punch ¾" x ½", Shear 1¼" Rd., 1¾" Sq. 3 x 3 x ⅝" Angles
#44 x 48 Buffalo RAP, Capacity ½" x ⅝"
Cleveland Style G Single End, 60" Throat
#10 Kling, 48" Throat, Punch 2" thru 1"
No. 1½ Buffalo Universal Ironworker

ROLL—FORMING
Model 14 L-M-1 Tishken Roll Forming Machine 1½" Dia. Spindle, 3½" Capacity, With Cut-Off

ROLLS—PLATE STRAIGHTENING
72" Bertsch Seven Rolls, 7" Dia.
86" H & J Six Rolls 10" Dia.
12' Newbold, Nine Rolls 14" Dia.

ROLLING MILLS
8" Three High Bar Mill
18" Three High Bar Mill
10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill
12" x 16" Phila. Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
26" x 54" United Single Stand, Two High
26" x 72" Cold Rolling Mill
44" x 144" Three High Sheet Mill
22" x 40" Three High Sheet Mill

SHEAR—GATE
96" x ⅜" Beatty

SHEARS—ROTARY
#23A Quickwork Whiting, 3/16" Capy.
#250 Kling, ¼" Capy.

SHEAR—SQUARING
10' x ¼" Toledo

SLITTERS
12" Blake & Johnson
36" Wean Slitting Line
32" Stamco Slitting Line

SWAGING MACHINE
#6½A Fen, Capacity 2¼" Tube, 3¾" Solid 10" Die Length Hydraulic Feed, LATE

TESTING MACHINES
20,000# Baldwin Universal Hydraulic
60,000, 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb Compression

TUBE MILL
Etna 1K Welded Tube Mill, Cut-off & Transformer Capy. ⅛" OD 0.28 wall to 2" OD .120 wall

WELDING POSITIONER
14,000# Cullen Friestedt Model #140, 220/440

Manufacturing

A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY 8
Telephone COrtlandt 7-3437

Equipment

Confidential Certified Appraisals
Liquidations — Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800	1800
	1500	G.E.	MT	6600	257
1	1100	F.M.	OVZK, B.B.	4800	1800
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-559S	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150	(unused) Whse.	"W	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
2	650	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	354
1	400	G.E.	IK	2200	500
1	200	G.E.	IK-17	440	580
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440900/450	
1	150	Whse.	CS8586S	440	880
1	150	Whse.	CS	440	530
2	125	Al. Ch.	ARW	2200	1750

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501SL	4000/6900/13800	514
1	2850	Whse.	.8 p.f.	2300/4600	514
1	2800	Whse	.8 p.f.	2300	720
2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12000	600
1	500	G.E.	TS-7567	2200	1200
1	450	Whse.		2200	128.5
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800

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ELECTRICAL EQUIPMENT

PACKAGE MILL DRIVES IN STOCK

1500—HP G.E. mill motor, rev., 600-VDC, 150/300 R.P.M., and 1250-KW G.E. M-G Set, 600-VDC with 1750-HP, .8 P.F. synchronous motor, 2300/4160-Volt, 3 phase, 60 or 25 cycle. Designed for variable voltage drive, all enclosed, forced ventilated.

IDEAL REEL DRIVES

(2)—600-HP Allis-Chalmers mill motors, 600-VDC, 300/600 R.P.M., with a 1200-KW, 600-VDC Westinghouse M-G Set, 1750-HP synchronous motor, 4160/2300-Volt, 3 phase, 60 cycle.

(2)—275-HP Westinghouse mill type motors, 230-Volt, 425/850 R.P.M., with 2 or 3-unit, 600-KW M-G Set, 250-VDC and 900-HP synchronous motor, 2300-Volt, 3 phase, 60 cycle.

(2)—100-HP Electro-Dynamic motors, 230-VDC, 450/1350 R.P.M., with 3-unit, 300-KW Allis-Chalmers M-G Set, 2300/440-Volt, 3 phase, 60 cycle.

SPECIAL

(2)—600-HP Westinghouse mill motors, 230-VDC, 110/220 R.P.M., anti-friction pedestal bearings.

MOTOR GENERATOR SETS

Qu.	K.W.	RPM	Make	Volts DC	Volts AC
1	1250	720	G.E.	600	2300/4160
1	1000	720	Whse.	600	2300/4160
1	500	1200	Whse.	125/250	2300/440
1	500	720	Cr.Wh.	575/600	2300
1	300	1200	Al. Ch. 3-unit	250	2300
1	300	1200	G.E.	250	2300
1	200	1200	Cr. Wh.	250	2300
1	200	1200	Elliott	125	4000/2300
1	200	900	G.E.	250	2300
1	175	1200	G.E.	250	440/220
2	150	1200	Whse. SK	250	2300/440
2	150	1200	Reliance	125	2300/440
1	150	1200	G.E.	250	2300
1	100	1200	Whse. SK	125/250	440/220
1	100	1200	Al. Ch.	250	4600/2300

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16" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Fillmatic pl. cylindrical, 1942.

HAMMERS
No. 3C Chambersburg pneumatic, serial No. 2297.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.

LATHES
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
No. 5 Gisholt ram type Univ. Turret Lathe, 1940.
14" x 6' Hendey Toolroom, 1940.
16" x 36" Landis type C hyd. pl. cylindrical, 1942.
36" and 42" Bullard New Era vertical turret lathes.
126" x 96" CC Niles Bement Pond engine lathe, 60 HP, M.D.

MILLING MACHINES
No. 2 Brown & Sharpe vertical mill, new 1943.
No. 4 Cincinnati high power plain horizontal mill, serial E 506 J.
No. 5-48 Cincinnati hydromatic duplex mill, serial 3B5IDIK-5.
No. 2-24 Cincinnati automatic simplex mill, serial No. 1B3PIT-1.

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200 ton No. 7-72 Bliss S.S. D.C. Press, Air Clutch.
260 ton No. 196½-72 Toledo D.C., Toggle drawing.
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500 ton No. 1039 Hamilton D.C. adj. bed. 60"x102".
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500	G.E.	KT-424	450
350	*G.E.	KT-559A	1800
250	Westg.	CS-81206 TEFC	1800
250	G.E. (2)	KT-559	1800
250	*L-Allis	OEX-148	720
250	*G.E.	IK	600
250	G.E.	IK-17A	600
250	Westg.	CS-14	514
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METALWORKING BRIEFS

DuPont Cuts Titanium Sponge Prices

Prices of titanium sponge were lowered from five to 25 cents a pound by the DuPont Co., effective Dec. 5. Grade A-1 sponge was cut from $3 to $2.75; grade A-2, from $2.70 to $2.50; and grade A-2 fines from $2.30 to $2.25.

Bethlehem Steel Acquires Youngstown

Bethlehem Steel Co. and Youngstown Sheet and Tube Co. jointly announced this week they had entered into an agreement for acquisition by Bethlehem of the properties and assets of Youngstown. The merger had been in the works for some time. Dept. of Justice has advised that it intends to sue to enjoin the move on the grounds of anti-trust violation.

Rambler Sales Gaining

Indications are that the Rambler continues to gain acceptance in this country. Sales of the compact car in November were up 122 pct over the same period in 1955. Dealer orders continue to exceed factory schedules and the company has upped production accordingly in December to meet the demand.

U.S. Firm Begins African Titanium Hunt

Exploration for titanium bearing ores will be started soon in Liberia, West Africa, by Columbia Southern Chemical Corp. According to E. T. Asplundh, C-S president, technicians and geologists are enroute. The company has an agreement with the Liberian government to mine any such minerals it finds.

Expansion Plans For U.S. Steel

U. S. Steel Corp. has given its operations department the go ahead signal for an improvement program that would give its Pittsburgh district 670,000 ingot tons additional steelmaking capacity. Expansion is planned for openhearth and electric furnaces and finishing lines. Almost two-thirds of the increased tonnage will involve plates, structurals and forgings.

Canadian Steel Output Goes Up

Canadian steel ingot and castings production in October totaled 466,175 net tons—a daily average of 99.3 pct of rated capacity. Pig iron production for the month was 307,630 net tons, or 94.8 pct of rated capacity. Both totals were higher than October, 1955, production figures.

NSF Gives Almost $6 Million For Research

Basic science research got another windfall from the National Science Foundation. The group announced 326 grants totaling $5,963,724 to institutions and individuals in the U. S., Hawaii, Canada, Israel and Japan. Since the beginning of the NSF program in 1951, 2821 such awards have been made, for a total of about $36 million.

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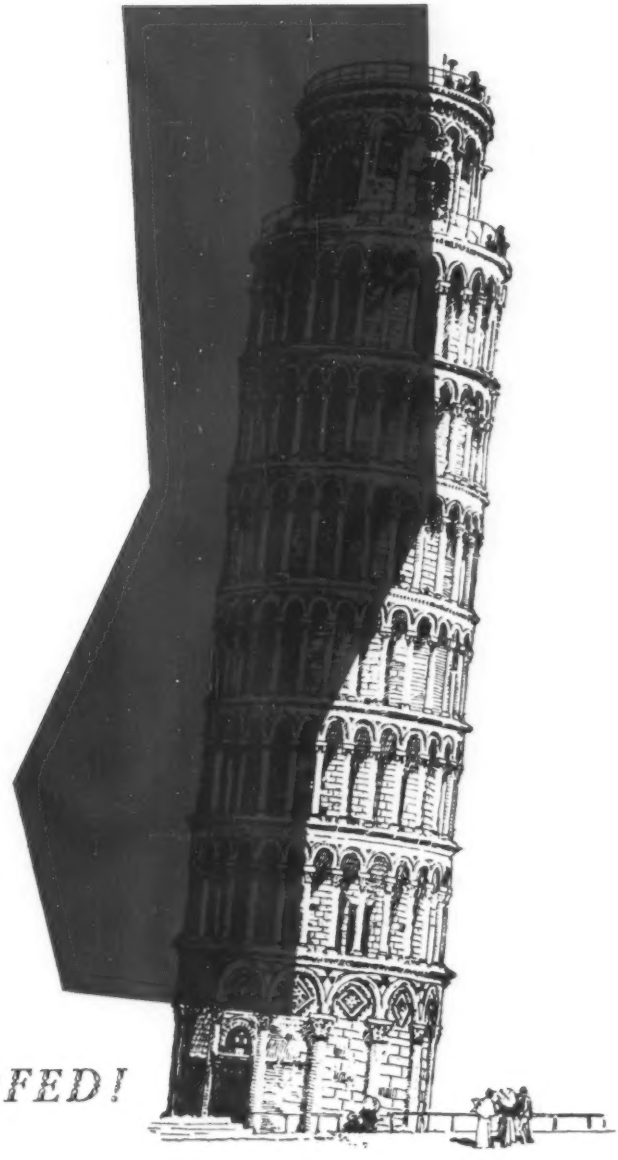

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